

Bibliotheca Herpetologica

A Journal of the History and Bibliography of Herpetology



VOL. 19

International Society for the History and Bibliography of Herpetology

THE SOCIETY

Mission. The ISHBH aims to promote research related to historical herpetology. The Society is devoted to stimulating and advancing the study of the history of the herpetological discipline and its bibliography. We bring together individuals for whom the history and bibliography of herpetology are appealing. We promote the knowledge of these and related topics among members and the general public. The Society was established in 1998. Membership is open to anyone who shares the aims of the Society.

Activities. The society members meet every year, usually in connection with other general herpetological meetings with international participation. Activities include visits to private and public libraries, museums and other places with historical links to the discipline. We organize workshops and sessions in the fields that form parts of larger national or international meetings on herpetology. Our shared lunches adjacent to the yearly business meetings have become popular among members and guests. The Society works to facilitate both formal and informal contacts among members.

Journal. The ISHBH publishes the journal *Bibliotheca Herpetologica*, which is the central pillar of the Society. It contains articles, essays, bibliographies and news of people and events in our field and is a peer-reviewed. The many important contributions make the publication a vital source for bibliographers, historians and taxonomists alike but at the same time the papers are by and large appealing to the layperson in the field.

Beginning with volume 14, ISHBH adopted an open access publication model. Articles in *Bibliotheca Herpetologica* will be available online as soon as they receive final editorial approval. At the end of the year a hard copy version of *Bibliotheca Herpetologica*, containing all articles published that year, will be printed and distributed to current members.

The name of the journal, up to volume 5(1), was: *International Society for the History and Bibliography of Herpetology Newsletter and Bulletin*.

Membership. The membership fees cover the calendar year. ISHBH membership categories are: Corresponding Membership US\$25/year (open access only plus all other membership benefits), Regular Membership US\$50/year, Institutional Memberships US\$75/year, and Sponsoring US\$75/year. Regular, Institutional and Sponsoring members will receive a hard copy of each volume of *Bibliotheca Herpetologica*. Note that Life Members will retain their status. However, we are no longer offering new Life Memberships. To Join, go to our website <http://www.ishbh.com> and click on the Membership tab.

OFFICERS

Executive Committee Officers:

Chairperson: Aaron Bauer (USA)

Vice Chairperson: Matthew Bettelheim (USA)

Treasurer/Membership Secretary: John Moriarty (USA)

Editor: Breck Bartholomew (USA)

Managing Editor & Webmaster: Ralph Tramontano (USA)

Open Portfolio: Erin Anthony (USA)

www.ishbh.com

All articles on pp. 1-150 copyrighted and version of record originally published online in 2025 (exact publication date at bottom of first page of each contribution). Hardcopy published December 2025.

FROM THE CHAIRPERSON

This year the Executive Committee underwent its first change of personnel since the ISHBH reorganized in 2020. After years of service, Eric Hilton (Treasurer), John Murphy (Membership Secretary), Chris Bell (Vice Chairperson) and Luis Ceriaco (Open portfolio), stepped down, making way for new leadership. On behalf of the society, I thank them for their service and contributions. I make special note that it fell on Eric's shoulders to transfer the society's funds from Sweden to the United States and to secure our tax-exempt status as a U.S.-based non-profit organization. These tasks involved innumerable forms, phone calls and emails. This would have been a great deal of effort for any herpetologist, but Eric is an ichthyologist, so his dedication to our society is even more noteworthy! Breck Bartholomew (Editor of *Bibliotheca Herpetologica* and *Wahlgreniana*), Ralph Tramontano (Managing Editor) and I (Chairperson) remain in our posts, but we are joined by John Moriarty, Matthew Bettelheim, and Erin C. Anthony. John returns to us (he was ISHBH Treasurer from 2004 to 2012) after serving as Treasurer of the Society for the Study of Amphibians and Reptiles (2020–2024) and will merge the duties of Treasurer and Membership Secretary. Matthew, whose name will be familiar to readers of *Bibliotheca Herpetologica* from his many articles, will take over as Vice Chairperson, and Erin, who recently served as President of the Virginia Herpetological Society, will bring her organizational experience to the ISHBH in the Open Portfolio position. I welcome them and look forward to working together to benefit the ISHBH and its members.

Reflecting on the year gone by, the ISHBH has enjoyed numerous successes. In December 2024, the ISHBH received its designation as a tax-exempt organization in the United States and in January 2025, we were able to accept a substantial donation from the estate of our founder, the late Richard Wahlgren. Our new status allows others to deduct contributions to the society, and I am happy to announce that we have received another generous donation from John Simmons and Julianne Snider. These gifts place the ISHBH on stable footing and, while the principal will remain untouched, revenue from interest will eventually be used to support our publications and activities of the society.

Breck has outlined new and exciting developments on the publication front. Under his leadership, the ISHBH is exploring new options for disseminating our journals. *Bibliotheca Herpetologica* continues to publish high quality papers across the gamut of herpetological history and *Wahlgreniana* is attracting more monographic contributions. In 2025 we were also co-publishers with SSAR of *The Dutch Indies Commission and the Herpetological Legacy of Heinrich Boie (1794–1827)* by Jay Savage, Max Sparreboom and Greg Pregill. Sadly, since the publication of the book, Jay has passed away. At the age of 97 he not only contributed much to herpetological history and bibliography but left a historical legacy himself.

As usual, we were represented at the Joint Meeting of Ichthyologists and Herpetologists, this year in St. Paul, Minnesota. Nine members and two guests were present at the business meeting, and more than a dozen people attended the trip to the Wangenstein Historical Library of Biology and Medicine at the Minneapolis campus of the University of Minnesota to tour the collection and see the display of books arranged by John Moriarty and curator Lois Hendrickson. Hopefully, opportunities for us to partner with other organizations will develop. In May 2025 I was elected as Chairman of our German sister society, the DGHT (Deutsche Gesellschaft für Herpetologie und Terrarienkunde) Working Group for Literature and History of Herpetology and Terrarium Science (LGHT), the publisher of the journal *Sekretär*. I see this as an excellent opportunity to develop closer ties between the two societies and look forward to possibilities for joint publications and meetings, as well as increased research and book collecting connections between members.

Aaron M. Bauer, Chairperson
Villanova, Pennsylvania, USA

FROM THE EDITOR

One of the papers in this volume prompted an expansion of our efforts to make both *Bibliotheca Herpetologica* and *Wahlgreniana* widely available via open access. Up until this year, every issue of *Bibliotheca Herpetologica*, and its predecessor, have been available on the ISHBH website. However, Glenn Shea's paper on the origin of the name *Ristella rurkii* justified registration with ZooBank.

For a journal to be registered with ZooBank, it must be permanently archived in a designated digital archive. Clearly our website does not meet the requirements to be considered an archive. Like some other herpetological publications, if something were to happen to the society or even a change in officers, the open access publications risk being lost.

After much searching, and contacting various databases, the Internet Archive (Archive.org) fit our needs the best. Primarily, the Internet Archive is free and does not require us to have an affiliation with another institution to be able to archive our publications. I would have preferred to archive the journal in the Biodiversity Heritage Library, but this requires an appropriate sponsoring institution. If anyone knows of a way to have ISHBH publications archived in the BHL database, please let me know. I still believe this would be the best fit.

After uploading all previous issues of ISHBH journal and newsletter, ZooBank accepted *Bibliotheca Herpetologica* as a valid journal to register nomenclatural acts under the rules of the ICZN Code of Nomenclature and Glenn Shea was able to register his paper. Being considered a valid journal for

publications with taxonomic implications is a milestone that open up a whole new range of possible historical papers that we can publish.

Later in the year, an author of a potential volume of *Wahlgreniana* asked if it was possible to make this series open access in addition being available in print. Open Access allows the publication to reach more people, particularly those outside the USA and Europe where mailing costs have become prohibitive for most publications. None of the past authors of *Wahlgreniana* volumes were opposed, so this series is now available through the Internet Archive as well. To find all of the ISHBH publications in the Internet Archive, go to Archive.org and search for 'ISHBH' (<https://archive.org/search?query=ishbh>).

Beyond securing ISHBH's impact well into the future through these archiving efforts, the journal continues to receive a wide variety of submissions. Three papers have already been submitted for volume 20. In addition, *Wahlgreniana* volume 4, "On Amphibians and Reptiles in Linnaeus's Students' Dissertations" by Esteban O. Lavilla will be published in January 2026. This volume consists of English translations of all of the dissertations, or parts of dissertations dealing with amphibians and reptiles. In addition, Lavilla has added 466 notes to clarify sections for the modern reader and an extensive bibliography.

We are off to a good start for 2026, but additional contributions to both *Bibliotheca Herpetologica* and *Wahlgreniana* are always welcome. Please consider contributing to ISHBH, if not by writing, then by spreading the word about the society, or sharing our publications online.

Finally, I would like to thank all of the authors who have submitted papers for publication. Of course, the many reviewers deserve a special thanks. Their work often goes unrecognized, but is vitally important for any publication. Thank you all.

Breck Bartholomew, Editor
Salt Lake City, Utah, USA

ABOUT THE COVER

The Natural Science Commission for the Dutch East Indies (1820–1850) organized an expedition to New Guinea from 5 July to 29 August, 1828. In this volume of *Bibliotheca Herpetologica* (p. 57) Hans Jacobs and Glenn Shea have documented and translated the archival manuscript material from this expedition relating to the eleven species of snakes and non-scincid lizards described. This material includes the three images gracing the cover of this volume of *Bibliotheca Herpetologica* (Figs. 12, 14 and 16 in that article).

Accompanying the expedition to New Guinea was Pieter van Oort (1804–1834), a draftsman whose task was to make depictions of the landscapes, plants, and animals seen, and is presumed to be the artist behind the three images. Pieter

van Oort was born on 10 October 1804 in Utrecht, in the Kingdom of the Netherlands. He was the son and eldest of seven children of the painter Hendrik van Oort (1775–1847), a Dutch painter known for his landscapes and genre scenes, particularly those that capture rural villages, small towns, and the everyday life of rural folk in the Netherlands (https://en.wikipedia.org/wiki/Hendrik_van_Oort).

At one point, Pieter van Oort worked at the Royal Veterinary School in Utrecht, where he studied the drawing of natural history objects. In 1825, he was hired by Heinrich Boie as a draftsman at the National Museum of Natural History in Leiden and was then assigned to the Natural Science Commission for the Dutch East Indies. Draftsmen accompanied scientific expeditions as illustrators, producing systematically made depictions of landscapes, plants, and animals. On 21 December 1825, he sailed from the Netherlands to Java with naturalists Heinrich Boie, and subsequently participated in several expeditions throughout the region, including the trip to New Guinea discussed in Jacob and Shea's article.

On 4 June 1833, an expedition to Sumatra began and between 1833 and 1834, he worked along the island's west coast. Near Padang, he died of "gall fever" (likely malaria), the same disease that had caused Heinrich Boie's death on 4 September 1827. At the time, he was unmarried but left behind a daughter from an extramarital relationship with an Indonesian woman. His self-portrait was sent back to the Netherlands with the note "To be sent to my parents after my death" (Fig. 1) (https://nl.wikipedia.org/wiki/Pieter_van_Oort).

Ralph Tramontano, Managing Editor
Newport, NC, USA



Fig. 1. Self- portrait of Pieter van Oort.



How to Raise a Bullfrog—A Further Update with Information on a Possible Albert Broel Manuscript

C. Kenneth Dodd, Jr.

5222 N.W. 56th Court, Gainesville, Florida 32653, USA. terrapene600@gmail.com

Tracing the history of an industry where obscure publications and ephemera predominate is difficult. Such is the case when documenting the history of frog farming in North America. Historians assemble as much material as possible before publishing their findings, but there is always the possibility of finding new information that had been unknown or unattainable previously. In this note, I present updated information on a publication mentioned in Dodd and Jennings (2021) that we had not been able to locate, report on another frog raising brochure, add a note on Albert Broel's (American Frog Canning Company, New Orleans) 1945 frog-raising manual, and discuss a manuscript that might be an original outline for Broel's system of giant bullfrog culture.

In Dodd and Jennings (2021), we noted a publication on frog farming published in 1975 by the Quaestor Publishing Company of Rochester, New York. We had been unable to find a copy of either the long or the short version, and we attributed the author as anonymous. I recently obtained a copy of the shorter version (30 p). Although Quaestor was the publisher and promoter (Fig. 1), the author was John Bravenec Jr. (3 October 1933 – 10 September 2006). The brochures sold for \$14.95 each, with the seller receiving \$8.95 in return for distributing them. The brochures contain mostly typescript basic information, followed by four figures showing layouts for various types of breeding operations. John Bravenec was a Brethren minister in Seaton, Texas, for most of his life. How he became interested in frogs is unknown, but his obituary noted that he and his brothers were well-known in their younger days for their bullfrogging adventures. Bravenec's obituary is at: https://www.findagrave.com/memorial/16001130/john_jerry_bravenec (accessed 4 November 2024).

Lesters Bullfrogs Rana Catesbeiana. This short brochure (Fig. 2, 12 p.) was published by Dozier Lester (28 December 1928 – 3 May 2015) of Duson, Louisiana. The brochure is undated, but a letter in my possession seeking a partner for Lester's "Frog Feeding Apparatus" is dated 23 March 1980 (Fig. 3), and a licensing form for this invention is dated 10 May 1977. These dates suggest a late 1970s publication date. The brochure is entirely in text and there are no illustrations of Lester's feeding apparatus. His obituary states that "Dozier had a passion for raising bullfrogs and was known to many

as the "frog man." Dozier began raising frogs in the spring of 1972 and gave up his small business in the fall of 2013. One of the highlights during his frog raising years was being chosen as the Grand Marshall of the Rayne Frog Festival in September of 2005. He supplied the Frog Festival with all the frogs they needed for many years. One of Mr. Lester's many accomplishments was the design and patent of the "frog feeder." In July 1982, Lester was awarded a patent for his bullfrog food mixture consisting of fish meal, ground crawfish hulls, ground limestone, two sodium compositions, water, and horsehair; the horsehair was to stimulate swallowing. Lester raised bullfrogs in his backyard and sold them commercially and for scientific research. A story about him was published in the 14 March 2007 issue of *The Independent* (<https://theind.com/articles/64/>; accessed 4 November 2024). Lester's obituary is at: <https://www.burtonfuneralhome.net/obituary/3097741> (accessed 4 November 2024).

Frog Raising, Broel System, 1945. As noted in Dodd and Jennings (2021), there were two editions of this publication, 1943 and 1945. Although we only illustrated the 1943 edition (p. 87), the 1945 edition has a cover of a different color with slightly different wording (Fig. 4). The text is identical to the 1943 edition, as are the black and white photographs. However, the photographs are placed in different places within the 1945 manual, and the last photo in the 1943 edition, depicting a racist photo and caption of a small black boy, is replaced by a photo of a clean-cut white boy holding a bullfrog.

Broel Manuscript. In mid-2024, I obtained a copy of a hand-written manuscript, written in a black copy book (19.5 x 24 cm; Fig. 5 A–F), of the *Broel System of Giant Bullfrog Culture*. The manuscript covers the first 16 lessons of the Broel system, plus the supplements on Vegetation (No. 1) and Before Breeders Arrive (No. 2) (see titles in Dodd and Jennings, 2021). Although unpaginated, there are 122 pages of meticulously single-spaced text in a cursive hand-writing, liberally supplemented by drawings from the various lessons. The text is not a perfect copy of the lessons, but much of it is word-for-word from them. The manuscript apparently was not written at one sitting, as various colored inks were used. There is very little crossing-out or editing, suggesting that whoever wrote it might have been copying from another

QUAESTOR PUBLISHING COMPANY
2680 WEST RIDGE ROAD --- SUITE 106
POST OFFICE BOX 2787
ROCHESTER, NEW YORK 14626

(716) 225-8576

\$20,000 PER YEAR POSSIBLE RAISING BULLFROGS

THANK YOU for the interest that you have shown and for the time that you have invested to answer my ad offering information on the exciting and tremendous income potential in raising bullfrogs!

CONSIDER THE FOLLOWING FACTS:



- (1) Only ONE mature female bullfrog can produce from 15,000 to 25,000 eggs in a single year. Therefore, from each mature female bullfrog, you can obtain a minimum of 15,000 bullfrog eggs per year! You can allow as many or as few of these eggs to mature as you select. You will be pleased to learn that
- (2) A full grown bullfrog can bring as much as \$2.00 or more when sold! That's right! Your full grown bullfrogs can command a price of \$2.00 or more!
- (3) You can raise up to 20,000 bullfrogs on a single acre of land! Just think of the potential! Up to 20,000 bullfrogs on a single acre of land and each of them worth at least \$2.00 each! What a tremendous money-making opportunity!!

TO EXPLAIN THIS TREMENDOUS OPPORTUNITY, we contacted a professional bullfrog breeder with many years of practical experience. He has spent a good portion of his life working with bullfrogs and earning nice sums of money by raising and selling them. This professional bullfrog breeder has written a most valuable instructional manual on the subject of raising bullfrogs. By following the instructions in this manual, you should be able to earn as much as \$5,000 or more per acre per year by raising bullfrogs! This wonderful manual, "How To Raise Bullfrogs For Fantastic Profits", also discusses a method of raising bullfrogs that can bring in as much as \$24,000 or more per year! Equally startling is the fact that you may be able to raise these bullfrogs on a part of your land that otherwise may be quite useless to you!

EVEN IF YOU DO NOT HAVE A FULL ACRE OF LAND, you could still earn as much as \$1,000 or more per year with a backyard-type operation of only 66 feet by 66 feet! If further limited spacewise, you can still raise over 100 pounds of clean, delicious meat each year on a small hobby-backyard operation of only 20 feet by 30 feet! If you presently have no land at all, this manual will show you ways to acquire the land needed for your frog raising operation at very little cost to you! And even if you live in a restricted city neighborhood, this manual will show you how to raise a "pet-hobby" backyard operation of 50 to 60 bullfrogs in a space not much larger than a normal bath-tub without violating city or neighborhood restrictions! Even this minimal type of operation will pay or save you many times the modest cost of this manual!

BULLFROGS, although becoming very scarce, may be found in the wild in a range that extends from southern Canada through Mexico. They have been successfully introduced to Hawaii, Japan and Puerto Rico. Therefore, you should be able to raise bullfrogs anywhere in the United States (except Alaska). Moreover, the manual discusses a special technique that speeds up the growth of bullfrogs! This technique should help bullfrog raisers in the cooler climates to gain many of the ideal natural climate advantages of the southern states!

COPYRIGHT 1976
QUAESTOR PUBLISHING COMPANY

Fig. 1. First page of Quaestor Publishing promotional brochure accompanying *How to Raise Bullfrogs for Fantastic Profits*.

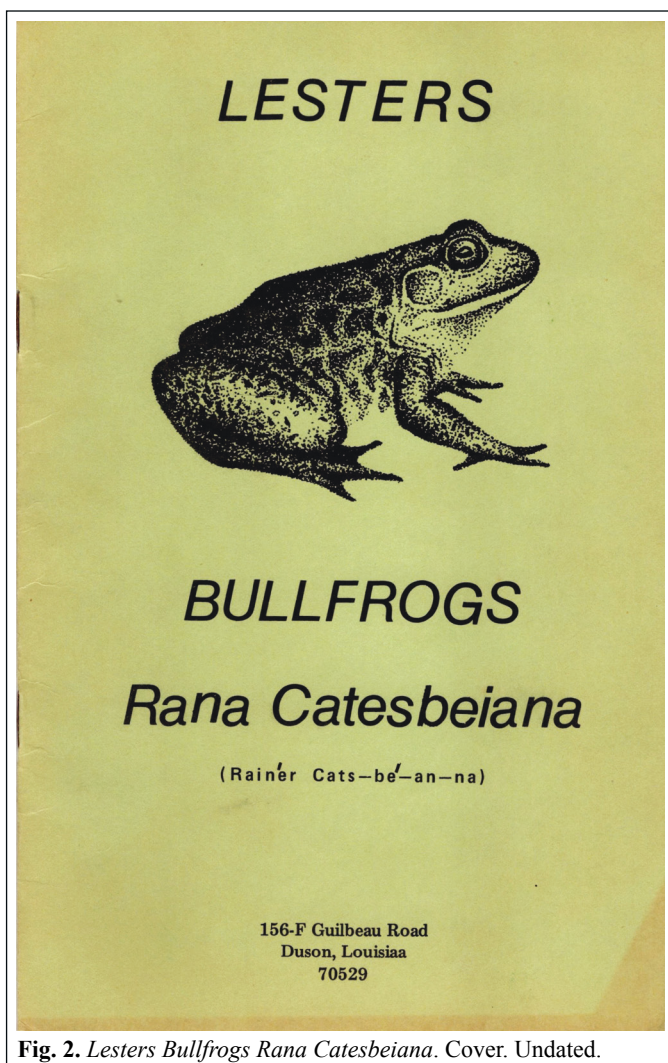


Fig. 2. Lesters Bullfrogs *Rana Catesbeiana*. Cover. Undated.

source. A tissue paper outline of the frog appearing on the cover of Broel (1943) was inserted in the book.

The style of the copybook is consistent with one from the 1930s, but who wrote or copied this manuscript? Unfortunately, no owner, author or date is included in the book. At the very end of the book, there is a stamp "M. Plum, Newark, New Jersey." M. Plum was a publishing company that specialized in printing pamphlets and booklets. M. Plum could have produced the copybook, or it could have been the publisher of Broel's "System" lessons; a publisher is not listed on any of the lesson instruction booklets, which were mass-produced. Albert Broel could have sent the copybook to M. Plum to let the publisher know what might be included in a final version, but it is impossible to be certain without supportive documentation. The seller of this manuscript had no idea of its provenance.

Is it possible to trace the handwriting? Little is available to compare the handwriting of the manuscript with known copies of Albert Broel's writing (and that, just of his signature). I have examined Broel's signature on letters and his WWI and WWII draft cards. The "A"s are clearly

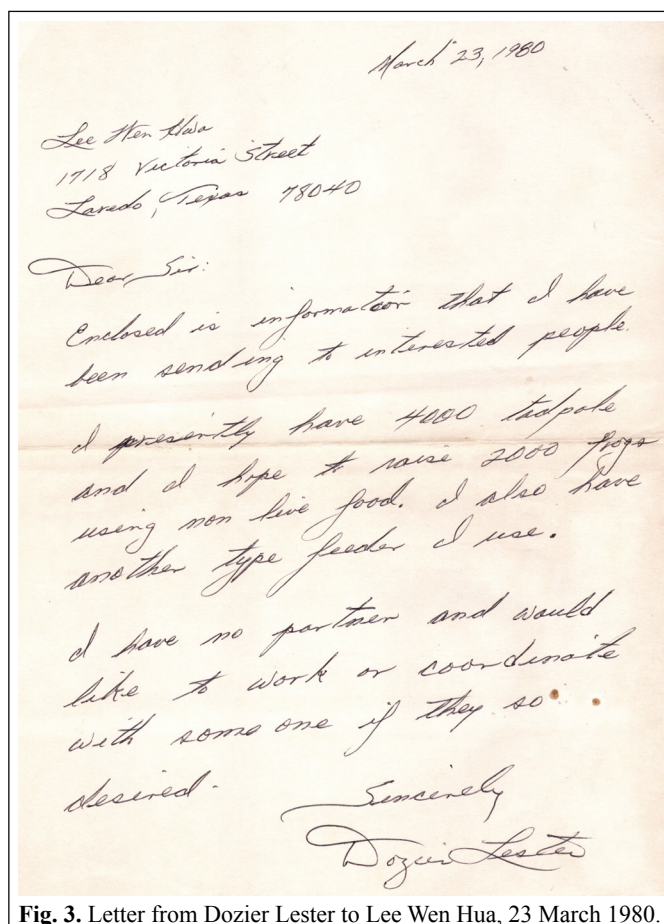


Fig. 3. Letter from Dozier Lester to Lee Wen Hua, 23 March 1980.

different, but the rest of the letters in "Broel" match very closely with the way they are written in the manuscript (Fig. 6). The copybook manuscript could be a "good draft." It certainly took a great deal of effort to write the text and draw the illustrations, but it may be impossible to ascertain the author or the reason for putting the text nearly word for word in a notebook. Although the manuscript could have been written by Broel, perhaps the manuscript in this copybook was simply an effort by a want-to-be frog farmer to avoid paying the cost of the Broel System lessons during the Great Depression (at \$47.0 - \$57.50, the total cost for all lessons was expensive in scarce Depression-era funds). It should be noted, however, that Albert Broel copyrighted his lessons and a warning against infringing on the copyright is printed on the back of each lesson booklet. Additional information on the lessons and the subsequent controversy surrounding them is in Dodd and Jennings (2021).

ACKNOWLEDGEMENTS

I thank Mark Jennings for supplying copies of Albert Broel's WWI and WWII draft registration cards and for his thoughts on the origin and authorship of the text.

REFERENCES

- Bravenec, Jr., John J. 1975. *How to Raise Bullfrogs for Fantastic Profits. A Complete Instruction Manual*. Quaestor Publishing Company, Rochester, New York. 30 p.
- Broel, Albert. 1943. *Frog Raising*. Marlboro House, Detroit. 164 p. Spiral Bound. [Broel System does not appear on the front cover]
- Broel, Albert. 1945. *Frog Raising*. Marlboro House, Detroit. 164 p. Spiral Bound. [Broel System appears on the front cover, but not on the title page]
- Dodd, C. Kenneth., Jr., and Mark .R. Jennings. 2021. How to raise a bullfrog—The literature on frog farming in North America. *Bibliotheca Herpetologica* 15(8):77–100.
- Lester, Dozier. Undated. *Lesters Bullfrogs. Rana catesbeiana. (Rainér Cats-bé-an-na)*. Dunson, Louisiaa (sic). Unpaginated (12 p.). [Lester's first name does not appear in the booklet]

We suggest the following format for citing this article:

Dodd, C. K. Jr. 2025. How to Raise a Bullfrog—A Further Update with Information on a Possible Albert Broel Manuscript. *Bibliotheca Herpetologica* 19(1):1–6.



Fig. 4. *Frog Raising, Broel System*. 1945. Cover.



Fig. 5 a-d. Pages from the copybook. A. Lesson 1; B. Lesson 3; C. Lesson 6; D. Lesson 9. Figures are inserted throughout the text and match those in the printed lessons.

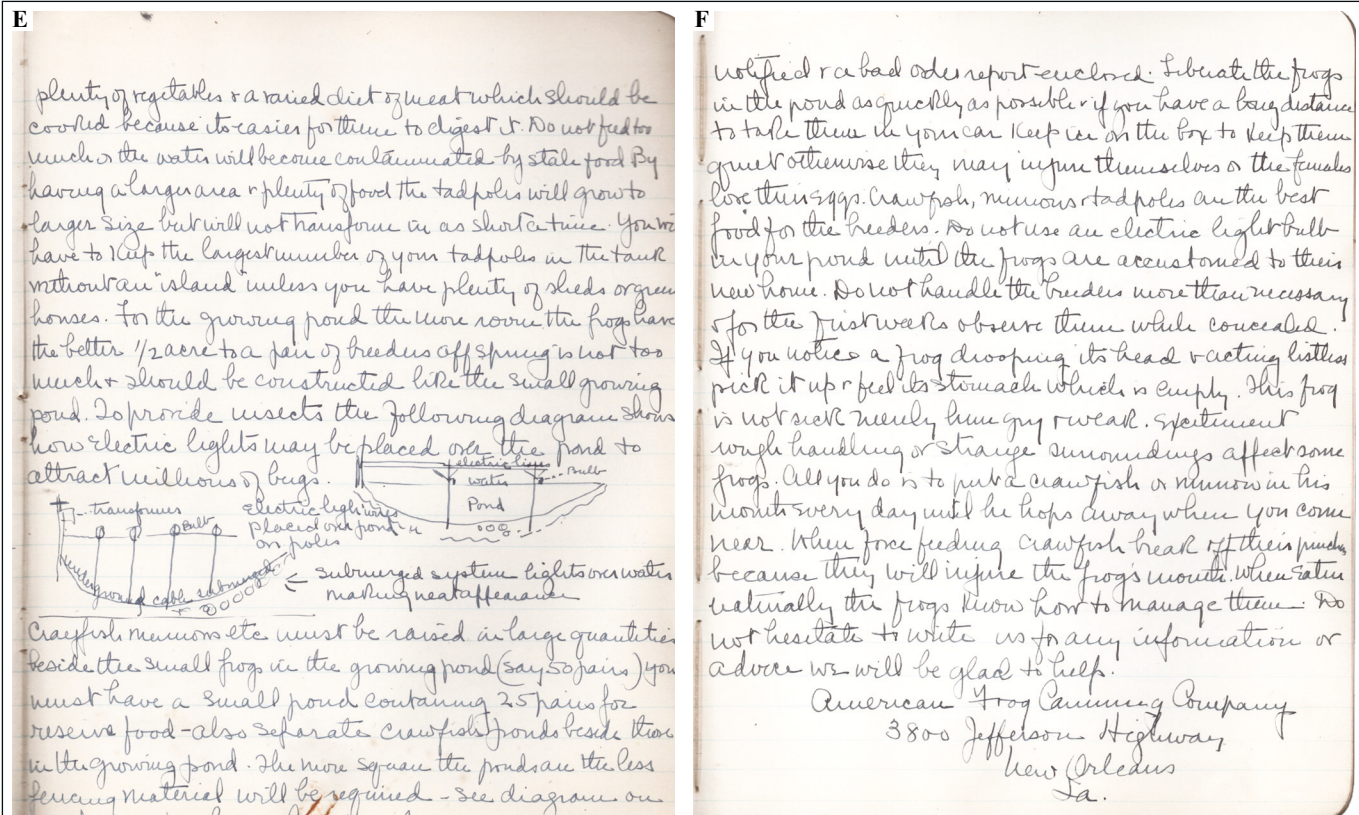


Fig. 5 e-f. Pages from the copybook. E. Lesson 15; F. last page in the copybook. Figures are inserted throughout the text and match those in the printed lessons.

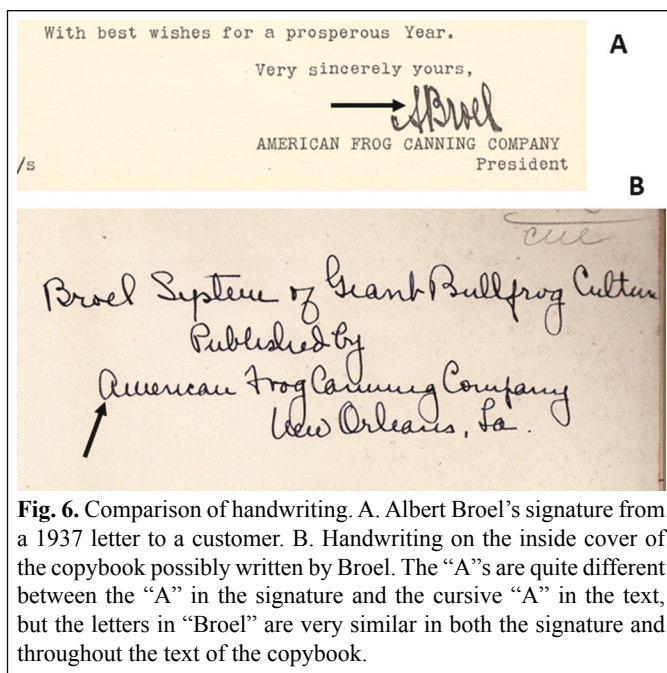


Fig. 6. Comparison of handwriting. A. Albert Broel's signature from a 1937 letter to a customer. B. Handwriting on the inside cover of the copybook possibly written by Broel. The "A"s are quite different between the "A" in the signature and the cursive "A" in the text, but the letters in "Broel" are very similar in both the signature and throughout the text of the copybook.

Comments on Early Herpetological publications about Prince Edward Island, Atlantic Canada

Aaron M. Bauer

Department of Biology and Center for Biodiversity and Ecosystem Stewardship
Villanova University, 800 Lancaster Avenue, Villanova, Pennsylvania 19085 USA
aaron.bauer@villanova.edu

Prince Edward Island, in the Gulf of St. Lawrence, is Canada's smallest province, with an area of 5660 km². Its herpetofauna is relatively depauperate. Ten species of amphibians and three species of snakes have been verified for the province (McAlpine et al. 2006; Rodrigue and Desroches 2018). The most comprehensive publications devoted specifically to P.E.I. are those of Cook (1960, 1967) who, along with Bleakney (1958) in his treatment of eastern Canada as a whole, provided a historical overview of studies on the herpetology of the province. They cited the works of Mellish ("1876" [sic] 1877) on snakes, Bain (1890) on the herpetofauna in general, and Hurst (1944) on amphibians — all dedicated to Prince Edward Island specifically. They additionally cited several papers by Philip Cox (1847–1939), an educator and naturalist from New Brunswick who was one of the founders of the Miramichi Natural History Association (Hamilton 2013) and collected on Prince Edward Island with Roy McLean Van Wart [Vanwart] (1877–1957) in 1896. Cox's herpetological records from P.E.I. were included in geographically broader publications on the herpetofauna of the Gaspé Peninsula and the Maritimes (1899a, 1899b, 1899c, 1903) or Canada as a whole (1907).

Cook (1967) wrote "J.T. Mellish (1876) was probably the first author to publish on the Island herpetology." However, a far earlier overview of the herpetofauna of P.E.I. was included by Stewart (1806) in *An Account of Prince Edward Island* (Fig. 1). Moriarty and Bauer (2024) included this work in their bibliography of P.E.I. herpetofaunal works, but the book has otherwise been uncited in the herpetological literature, and I take this opportunity to summarize its relevant content.

John Stewart (c. 1758–1834) was born in Kintyre, Scotland and came to Prince Edward Island in 1775 when his father was appointed Chief Justice of the colony. At the time, the Island was known as St. John's Island, and only 12 years had passed since it (as Île Saint-Jean) had been ceded by France to Britain at the close of the Seven Years' War (the North American theater of which is commonly referred to in the United States as the French and Indian War) in 1763. For the next six years it was governed as part of the colony of Nova Scotia, but in 1769 it attained the status of a separate colony, although the current name of Prince Edward Island

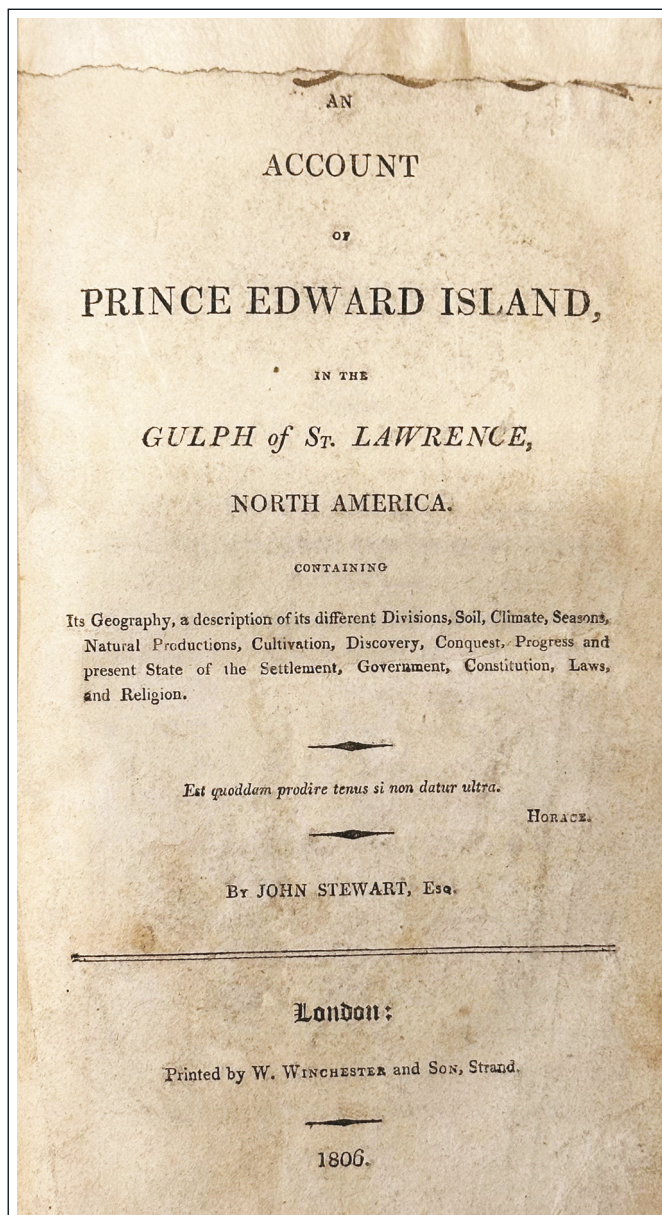


Fig. 1. Title page of Stewart's (1806) *An Account of Prince Edward Island in the Gulf of St. Lawrence, North America*. Collection of author.

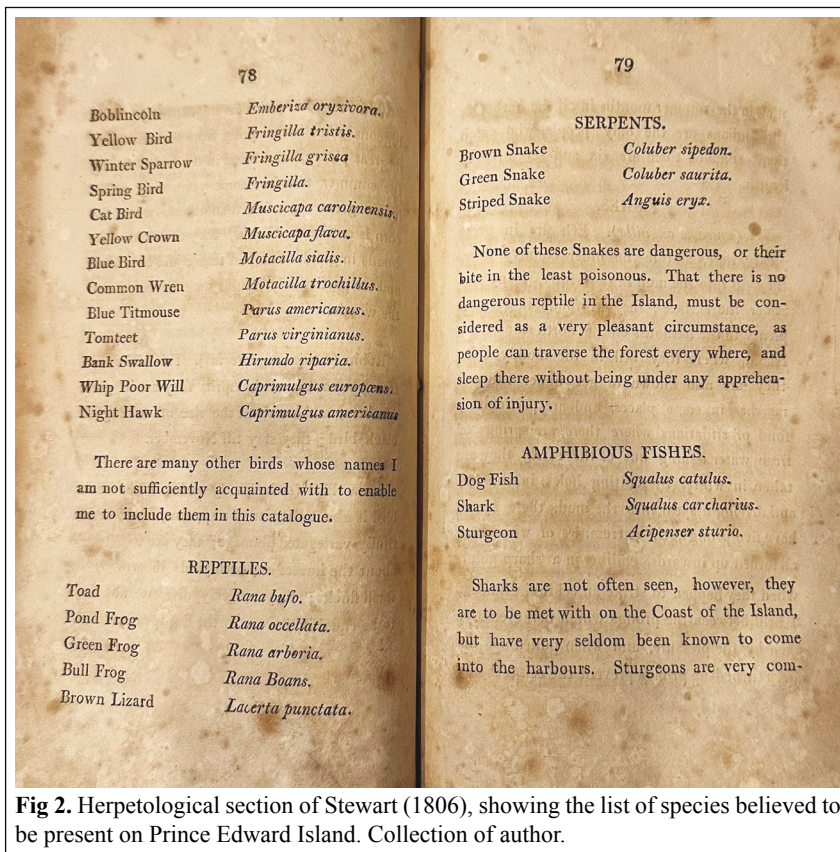


Fig 2. Herpetological section of Stewart (1806), showing the list of species believed to be present on Prince Edward Island. Collection of author.

was not adopted until 1798. Stewart was a major landowner and highly active in the politics of the Island. His career was characterized by a series of disputes and controversies that saw his influence ebb and flow. Stewart's book was written during the period (1804–1817) in which he was Paymaster General of British Forces in Newfoundland and divided his time between St. John's, Newfoundland and London. However, he returned to P.E.I. permanently in 1824 and in that decade served as both Speaker of the Assembly and Receiver General of Quitrents [a quitrent was a tax due to the government in lieu of performing services otherwise due] (Pigot 1975, 1987).

Stewart's book made him known as the first Island historian, but his documentation of natural history during this early period has also been considered to be an important contribution (Pigot 1987). The book includes a chapter (pp. 59–94) entitled: "Native Animals, Birds, Fishes, Reptiles and Insects." On p. 78 is a list of "Reptiles" and on the following page, a list of "Serpents." The only text beyond the list is Stewart's statement that there are no dangerous reptiles among those listed (Fig. 2). This statement, quoted in Pigot (1975) — a self-published book on the history of Mount Stewart, P.E.I., is the only mention of the herpetological content of Stewart (1806) that seems to have been reproduced in the literature in more than two centuries.

Stewart had no biological training, but as a long-time resident of Prince Edward Island he likely based his statements on his own observations and those of other eyewitnesses.

However, writing at the outset of the 19th century, his resources for the identification of the local species would have been limited. Stewart noted (1806: 59) that his catalogue of species was "arranged in the order of Linnaeus." Indeed, all of the names are combinations used by Linnaeus. Presumably Stewart had access to the 12th edition of *Systema Naturae* (Linnaeus 1766) or some distillation thereof, because one of the names he used, *Coluber saurita*, was only proposed in that work but was absent from the 10th edition (Linnaeus 1758). At that time, little had been published on the herpetology of what would become Canada, and even perhaps the most relevant work for P.E.I. — Pennant's (1787) *Supplement to Arctic Zoology*, which explicitly included British North America, itself drew largely on Linnaeus (1758), as well as Catesby (1734–1743, 1747), Lawson (1709) and other earlier sources, mostly from the American southeast. However, there is no evidence that Stewart had access to or used a copy of Pennant's work.

Stewart apparently selected the names that he thought fit the local species, although in many cases he was far off in his application.

His vernacular names provide a better guide to the actual species intended, particularly for the snakes. I have equated Stewart's names with the species known from Prince Edward Island in Table 1. Some, like *Rana bufo* (Toad) for *Anaxyrus americanus*, are quite obvious but others need some explanation. Because there are no lizards native to P.E.I., *Lacerta punctata* must refer to a salamander and "Brown Salamander" eliminates the two local ambystomatids. Only *Notophthalmus viridescens* qualifies as brownish and spotted and indeed, *L. punctata* was also the name applied by Pennant (1787) to this species. The remaining anurans pose the greatest challenge. *Rana ocellata* [sic] can only apply to *Lithobates pipiens*, given that *L. palustris*, the only other possibility, was only recently confirmed to be present in bog habitat on the Island and would have certainly escaped the notice of early casual naturalists. The nomina *Rana arboria* [sic] and *Rana Boans* both actually apply to hylid frogs, but there is only one hylid on the Island and it fits neither of Stewart's (1806) common names particularly well (Green Frog and Bull Frog, respectively). On the other hand, *Lithobates clamitans* is both green and has a much louder call than does *Pseudacris crucifer*. With some hesitation I equate Stewart's *R. Boans* with *L. clamitans* and *R. arboria* with *P. crucifer*.

Although concise, the herpetological section provides Latin names for the species recorded (Table 1), which makes this not only the first work on Prince Edward Island to do so, but one of the earliest, if not the earliest, in any work devoted to an area that would eventually become part of the nation

Table 1. Stewart's (1806) list of herpetological taxa in relation to the amphibians and reptiles now recognized from Prince Edward Island.

Currently Recognized on PEI	Stewart (1806)	Linnean Identity	"First" Published Record
<i>Notophthalmus viridescens</i>	<i>Lacerta punctata</i> (Brown Lizard)	<i>Riopa punctata</i> (Linnaeus, 1758)	Cox (1899c)
<i>Ambystoma laterale</i>			Hurst (1946) ¹
<i>Ambystoma maculatum</i>			Cox (1899b) ²
<i>Plethodon cinereus</i>			Bain (1890) ³
<i>Anaxyrus americanus</i>	<i>Rana bufo</i> (Toad)	<i>Bufo bufo</i> (Linnaeus, 1758)	Bain (1890)
<i>Lithobates clamitans</i>	<i>Rana Boans</i> (Bull Frog) ⁴	<i>Boana boans</i> (Linnaeus, 1758)	Cox (1899a)
<i>Lithobates palustris</i>			McAlpine et al. (2006) ⁵
<i>Lithobates pipiens</i>	<i>Rana ocellata</i> (Pond Frog)	<i>Osteopilus ocellatus</i> (Linnaeus, 1758)	Bain (1890) ⁶
<i>Lithobates sylvaticus</i>			Bain (1890)
<i>Pseudacris crucifer</i>	<i>Rana arboria</i> (Green Frog) ⁴	<i>Hyla arborea</i> (Linnaeus, 1758)	Bain (1890)
<i>Thamnophis sirtalis</i>	<i>Anguis eryx</i> (Striped Snake)	<i>Anguis fragilis</i> Linnaeus, 1758	Mellish (1877)
<i>Storeria occipitomaculata</i>	<i>Coluber sipedon</i> (Brown Snake)	<i>Nerodia sipedon</i> (Linnaeus, 1758)	Mellish (1877)
<i>Opheodrys vernalis</i>	<i>Coluber saurita</i> (Green Snake)	<i>Thamnophis saurita</i> (Linnaeus, 1766)	Mellish (1877) ⁷

¹Initially reported as *Ambystoma jeffersonianum*. Subsequently, P.E.I. specimens were redetermined as *A. laterale* on the basis of chromosomal data by Uzzell (1962, 1964) and by Cook (1960, 1967) on the basis of morphology and coloration.

²Cox (1899c) did not explicitly mention its occurrence on P.E.I. but called it "common in the maritime provinces." Cox (1907) subsequently explicitly noted its presence on the Island.

³Cook (1967) considered Bain's (1890) mention of a salamander being "found under stones and stumps" to refer to this species, although the first record explicitly attributed to *Plethodon cinereus* was by Cox (1899c).

⁴See text for discussion.

⁵Cox (1899a, b) reported *R. palustris* as "rare" or "very rare" in P.E.I. and Hurst (1944) subsequently also reported it from the Island. Cook (1967), however, provided detailed arguments against accepting these unvouchered records as evidence of the species occurrence.

⁶Cook (1967) considered Bain's (1890) reference to "Green and bronze-coloured Frogs" to apply to *Lithobates pipiens*. However, this description is far more apt for *L. clamitans*. Cook was likely swayed by Bain's comment that these frogs were "found in damp grass fields." Cox (1899a) was the first to explicitly note the occurrence of *L. pipiens* in P.E.I. (as *Rana v. virescens*).

⁷*Opheodrys vernalis* was mentioned only in a footnote by Mellish (1877) who noted that it had been present on the Island in the 1820s or 30s. Bain (1890) subsequently considered it rare in P.E.I., but this information was based directly on Mellish (1877). Although Cox (1903) described it as "fairly common" throughout the Maritimes he made no explicit mention of P.E.I. and the continued occurrence of the species was not verified by vouchered records until the 1960s (Thomas 1965).

of Canada. Further, it would stand as the only such list for P.E.I. for more than a century. The work of Mellish (1877) dealt only with snakes and that of Bain (1890) gave only common names and an imprecise count of species. Even the more "scientific" work of Cox was not consistently explicit about which species occurred in Prince Edward Island. For example, *Bascanion constrictor* (= *Coluber constrictor*) was stated to be absent from P.E.I. (Cox 1903) and *Rana palustris* (= *Lithobates palustris*) rare (Cox 1899a, b), but many species were simply stated to be widespread in the Maritime Provinces, leaving their presence on the Island ambiguous. Indeed, it was not until Hurst (1944) that an actual provincial summary of amphibian species was published. Another decade passed before the first point locality maps to include P.E.I. records was published (Logier and Toner 1955) and not until Bleakney (1958) was a "complete" provincial list presented, subsequently updated by Cook (1967). Only in 2003 was the herpetofaunal species list of P.E.I. finalized, with the confirmed discovery of *Lithobates palustris* (McAlpine et al. 2006).

John Thomas Mellish (1841–1924), the author of the second work on the P.E.I. herpetofauna (Mellish 1877) was born in Pownal, P.E.I. and educated at Mount Allison College (now Mount Allison University) in Sackville, New Brunswick. His early career was in education, and he served as a teacher and administrator at several institutions in Nova Scotia (Rose 1888). Mellish served as Secretary of the Nova Scotian Institute of Natural Science, in the Transactions of which he published on fish and fisheries (Mellish 1882) in addition to snakes. He was later admitted to the bar and during World War I he served in the War Office in London, England before retiring to Vancouver, British Columbia (Anonymous 1924).

Interestingly Mellish (1877) mentioned five snakes for Prince Edward Island, including all three that are actually present (*Storeria occipitomaculata*, *Thamnophis sirtalis* [as *Eutaenia sirtalis*] and *Opheodrys vernalis* [as *Chlorosoma vernalis*]). One of the others was *Bascanion constrictor* = *Coluber constrictor*. Cook (1967) convincingly debunked Mellish's racer record, which was the source for several later

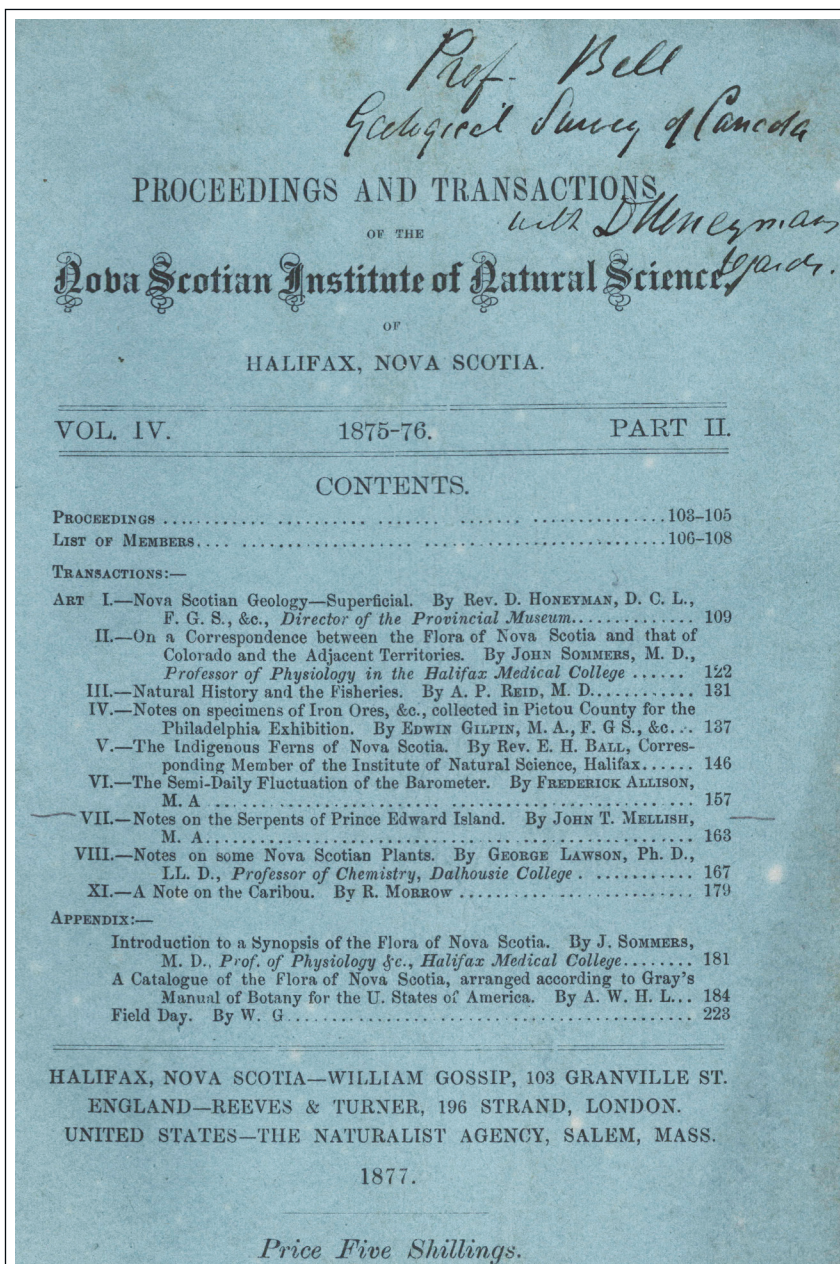


Fig. 3. Cover of Volume 4, Part II. of *Proceedings and Transactions of the Nova Scotian Institute of Natural Science* for 1875–76, showing Mellish's paper (Article VII) and the publication date of 1877. The dedication is from David Honeyman (1817–1889), the director of the Nova Scotia Provincial Museum to Prof. Robert Bell (1841–1917) of the Geological Survey of Canada. Collection of author.

citations of its occurrence on the Island. The fifth purported taxon was “*Coluber lineatus* ?.” As argued by Cook (1967), this is almost certainly a reference to particularly boldly striped individuals of *Thamnophis sirtalis*. He also noted that there appears to be no earlier references to Mellish's nomen, which was not a reference to *Coluber lineatus* Linnaeus, 1758 = *Lygophis lineatus*, but rather was intended as a new name. Subsequently, on the basis of geography, Boundy (1999) recognized *C. lineatus* Mellish, 1876 [sic] as a senior subjective synonym of the currently valid garter snake sub-

species *T. s. pallidulus* Allen, 1899, but, as it is also a junior primary homonym of *Coluber lineatus* Linnaeus, 1758, it does not endanger Allen's name. Cook (2007) and Wallach et al. (2014) appear to be the only other authors to have acknowledged the existence of Mellish's name. All of these authors cited the date of Mellish's description as 1876. As another minor correction to the literature of Prince Edward Island, I note that although the paper was read on May 8th, 1876, as printed on the first page of the paper, it was not published until 1877, as shown by the front cover of the issue of *Proceedings and Transactions of the Nova Scotian Institute of Natural Science* in which it appeared (Fig. 3).

ACKNOWLEDGEMENTS

I thank Tony Russell and Chris Bell for their useful comments on the manuscript.

REFERENCES

- Allen, G.M. 1899. Notes on the reptiles and amphibians of Intervale, New Hampshire. *Proceedings of the Boston Society of Natural History*, 29:63–75.
- Anonymous. 1924. J. T. Mellish passes away. *Vancouver Evening Sun*, Monday, March 31, 1924:1.
- Bain, F. 1890. *Natural History of Prince Edward Island*. G.H. Haszard, Charlottetown. 123 pp.
- Bleakney, J.S. 1958. A zoogeographical study of the amphibians and reptiles of eastern Canada. *National Museum of Canada Bulletin* 155. [iv] + 119 pp.
- Boundy, J.J. 1999. Systematics of the Common Garter Snake, *Thamnophis sirtalis*. Ph.D. dissertation, Louisiana State University and Agricultural and Mechanical College. xii + 481 pp.
- Catesby, M. 1734–1743, 1747. *The Natural History of Carolina, Florida and the Bahama Islands: Containing the Figures of Birds, Beasts, Fishes, Serpents, Insects, and Plants: Particularly, the Forest-Trees, Shrubs, and other Plants, not hitherto Described, or Very Incorrectly Figured by Authors. Together with their Descriptions in English and French. To which, are Added Observations on the Air, Soil, and Waters: with Remarks upon Agriculture, Grain, Pulse, Roots, &c. To the Whole, is Prefixed a New and Correct Map of the Countries Treated of. Volume II./ Histoire Naturelle de la Caroline, la Floride, & les Isles Bahama: Contenant les Desseins des Oiseaux, Animaux, Poissons, Serpents, Insectes, & Plantes. Et en Particulier, des Arbres des Forets, Arbrisseaux, & Autres Plantes, qui n'ont Point été Decris, jusques à Present par les Auteurs, ou peu Exactly Dessinés. Avec leur Descriptions en François et en Anglois. A quoi on a Adjouté, des Observations sur l'Air, le Sol, & les Eaux, avec des Remarques sur l'Agriculture,*

- les Grains, les Legumes, les Racines, &c. Le tout est Precedé d'une Carte Nouvelle & Exacte des Païs dont ils s'Agist. Tome II.* The Author, London. [4] + 100 pp., 100 pls., 20 pp., 20 pls., [7] pp., 1 map.
- Cook, F.R. 1960. An Analysis of the Herpetofauna of Prince Edward Island. Master of Science thesis, Acadia University. [not seen by author].
- Cook, F.R. 1967. An analysis of the herpetofauna of Prince Edward Island. *National Museum Canada Bulletin* 212. 60 pp.
- Cook, F.R. 2007. Canadian reptile studies: Anecdote to inventory. Pp. 5–22 in Seburn, C.N.L. and Bishop, C.A., eds. *Ecology, Conservation, and status of Reptiles in Canada*. Society for the Study of Amphibians and Reptiles, Salt Lake City, Utah [Herpetological Conservation, Number Two].
- Cox, P. 1899a. Anoura of New Brunswick. *Proceedings of Miramichi Natural History Association* 1899(1):9–19.
- Cox, P. 1899b. Freshwater fishes and Batrachia of the Peninsula of Gaspé, P.Q. and their distribution in the Maritime Provinces of Canada. *Transactions of the Royal Society of Canada Ser.2*. 5(4):141–154.
- Cox, P. 1899c. A preliminary list of the Batrachia of the Peninsula of Gaspé, P.Q. and the Maritime Provinces of Canada. *Ottawa Naturalist* 13:194–195.
- Cox, P. 1903. The snakes of the Maritime Provinces of Canada. *Proceedings of Miramichi Natural History Association* 3:11–20.
- Cox, P. 1907. Lizards and salamanders of Canada. *Proceedings of the Miramichi Natural History Association* 5:46–55.
- Hamilton, W.D. 2013. Cox, Philip, in: *Dictionary of Canadian Biography*, vol. 16. University of Toronto/Univeristé Laval, Toronto. (accessed 24 December 2024).
- Hurst, B. 1944. The amphibians of Prince Edward Island. *Acadian Naturalist* 1(3):111–116.
- Hurst, B. 1946. Jefferson's salamander in Prince Edward Island. *Acadian Naturalist* 2(6):121.
- Lawson, J. 1709. *A New Voyage to Carolina; Containing the Exact Description and Natural History of that Country: Together with the Present State thereof. And a Journal of a Thousand Miles, Travel'd thro' Several Nations of Indians. Giving a Particular Account of their Customs, Manners, &c.* (s. n.), London. [6] + 258 pp., 1 pl., 1 map.
- Linnaeus, C. 1758. *Systema Naturæ per Regna Tria Naturæ, Secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis, Locis. Tomus I. Editio Decima, Reformata*. Impensis Direct. Laurentii Salvii, Holmiæ [Stockholm]. [4] + 823 + [1] pp.
- Linnaeus, C. 1766. *Systema Naturæ per Regna Tria Naturæ, Secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis, Locis. Tomus I [Pars I]. Editio Duodecima, Reformata*. Impensis Direct. Laurentii Salvii, Holmiæ [Stockholm]. 532 pp.
- Logier, E.B.S. and Toner, G.C. 1955. Check-list of the amphibians and reptiles of Canada and Alaska. *Contributions of the Royal Ontario Museum of Zoology and Palaeontology* No. 41. v + 88 pp.
- McAlpine, D.F., Harding, R.W. and Curley, R. 2006. Occurrence and biogeographic significance of the pickerel frog (*Rana palustris*) on Prince Edward Island, Canada. *Herpetological Natural History* 10(1):95–98.
- Mellish, J.T. 1877. Notes on the serpents of Prince Edward Island. *Proceedings and Transactions of the Nova Scotian Institute of Natural Science* 4(2):163–167.
- Mellish, J.T. 1882. Fish culture. *Proceedings and Transactions of the Nova Scotian Institute of Natural Science* 5(1) [1879]:76–81.
- Moriarty, J.J. and A.M. Bauer. 2024. *State and Provincial Amphibian and Reptile Publications for the United States and Canada, Second Edition*. Wahlgreniana 3. vi + 85 pp.
- Pennant, T. 1787. *Supplement to the Arctic Zoology*. Henry Hughes, London. viii + 163 pp., 2 foldout maps.
- Pigot, F.L. 1975. *A History of Mount Stewart, Prince Edward Island*. Franklin L. Pigot, Charlottetown. [viii] + 128 pp.
- Pigot, F.L. 1987. Stewart, John (d. 1834) in: *Dictionary of Canadian Biography*, vol. 6. University of Toronto/Univeristé Laval, Toronto. (accessed 24 December 2024).
- Rodrique, D. and J.-F. Desroches. 2018. *Amphibiens et Reptiles du Quebec et Des Maritimes*. Éditions Michel Quintin, Waterloo. 376 pp.
- Rose, G.M., ed. 1888. *A Cyclopaedia of Canadian Biography: Being Chiefly Men of the Time*. Rose Publishing Company, Toronto. 816 pp.
- Stewart, J. 1806. *An Account of Prince Edward Island in the Gulph of St. Lawrence, North America*. Winchester and Son, London. xiii + [2] + 304 pp., 1 folding map.
- Thomas, M.L.H. 1965. The snake fauna of western Prince Edward Island. *The Canadian Field-Naturalist* 79:208–209.
- Uzzell, T.M., Jr. 1962. Morphology and Biology of the Salamanders of the *Ambystoma jeffersonianum* Complex. Master of Science thesis, University of Michigan. ix + 170 pp.
- Uzzell, T.M., Jr. 1964. Relations of the diploid and triploid species of the *Ambystoma jeffersonianum* complex (Amphibia, Caudata). *Copeia* 1964(2): 257–300.
- Wallach, V., Williams, K.L. and Boundy, J. 2014. *Snakes of the World: A Catalogue of Living and Extinct Species*. CRC Press, Taylor and Francis Group, Boca Raton. xxvii + 1209 pp.

We suggest the following format for citing this article:

Bauer, A. M. 2025. Comments on Early Herpetological publications about Prince Edward Island, Atlantic Canada. *Bibliotheca Herpetologica* 19(2):7–11.



The Mysterious Doctor Rurk and His Eponymous Catskink, *Ristella rurkii* Gray 1839 (Squamata: Scincidae: Lygosominae: Ristellini) with Notes on Other Collectors for the Museum of the Army Medical Service at Chatham

Glenn M. Shea

Sydney School of Veterinary Science B01, University of Sydney, NSW 2006,
Australia and Australian Museum Research Institute, The Australian Museum,
10 William St, East Sydney, NSW 2010, Australia.
glenn.shea@sydney.edu.au

<http://zoobank.org/urn:lsid:zoobank.org:pub:6C0B444B-DE7C-474E-B361-33CACE59354E>

Abstract: *Ristella rurkii*, although stated originally to be named after a “Dr Rurk”, was likely named after Dr William Augustus Burke, the first Inspector-General of Hospitals in India, who collected for the Museum of the Army Medical Service at Fort Pitt, Chatham. Burke was mostly based in north India, corresponding to the type locality of *R. rurkii*, and to the localities for his bird collections. However, the skink is only known from the Western Ghats of far southern India. With the type no longer extant, a neotype is designated to stabilise nomenclature. Known natural history collectors for the Fort Pitt Museum, along with their British Army service postings, are tabulated.

In the fourth and final part of his “Catalogue of the Slender-tongued Saurians”, John Edward Gray of the British Museum described a new genus and species of skink, *Ristella rurkii*, from material in the Chatham Museum, stated to be from “North India” with donor “Dr Rurk” (Gray, 1839; see also Beolens et al., 2011). The description was repeated in German translation five years later (Gray, 1844). Despite this initial stated type locality, the species name has consistently been assigned to a small skink species with restricted distribution in the Western Ghats of southern India (Gray, 1845; Günther, 1875; Boulenger, 1887, 1890; Hora, 1927; Roux, 1928; Smith, 1935; Sharma, 2002; Venugopal, 2010; Palot, 2015; Ganesh, 2018). In an attempt to resolve this apparent discrepancy, I tried to identify the mysterious Dr Rurk.

Rurk is an unusual surname, and not one that has been used in combination with someone in the medical profession. The “Chatham Museum” cited by Gray was the Museum of the Army Medical Service at Fort Pitt, Chatham, now disbanded (hereafter referred to as the Fort Pitt Museum). This was primarily a teaching collection established in 1816 as part of the Army Medical Service Hospital, and was housed in a small building within Fort Pitt at Chatham (Fig. 1). Medical graduates in the British Army were asked to send natural history and medical specimens to Chatham to develop a teaching collection for training new generations of army surgeons (Anon, 1833; Burton, 1838). Hence, it must be assumed that Dr Rurk was an army surgeon, or some other member of the Army Medical Service.

However, no member of the Army Medical Service with surname Rurk is listed in the detailed catalogue of the Service by Johnston (1917), suggesting that Gray may have mis-spelt the name in his description. Gray was notoriously poor with details in his published papers. Among numerous inconsistencies, Gray (1841) spelt the name of Dr John Mair (another donor to the Chatham collection) as “Maw” and “Mann” as well as the correct Mair. Scientific names applied by him to species also varied between and within papers, with the Australian agamid genus *Chelosania* Gray, 1845 also being spelt *Chelasonia* in the same monograph, and later spelt *Chelonasia* by Gray (1867). The Australian pygopod lizard originally described by Gray (1835) as *Lialis burtonis* was afterwards spelt by him as *Lialis burtonii* (Gray, 1841, 1867) and *Lialis burtoni* (Gray, 1842, 1845).

A thorough search through Johnston’s (1917) list identified the most likely misspelling as being for Dr William Augustus Burke, the first Inspector-General of Hospitals in India.

Another line of exploration is the listing of donors of birds and mammals in the published catalogue of those parts of the Fort Pitt Museum (Burton, 1838). A total of 67 donors are listed there (Table 1), of which 21 served in India. Most of these (13) were based in Madras Presidency, which could be considered the equivalent of “South India” (Table 1): Pasquale-Maria Benza, Robert Davis, John Hutchison, Lewis Leslie, Thomas Lewis, Patrick McKie, Donald McLeod, William Milligan, Alexander Morgan, James Mouat, Samuel Roe,

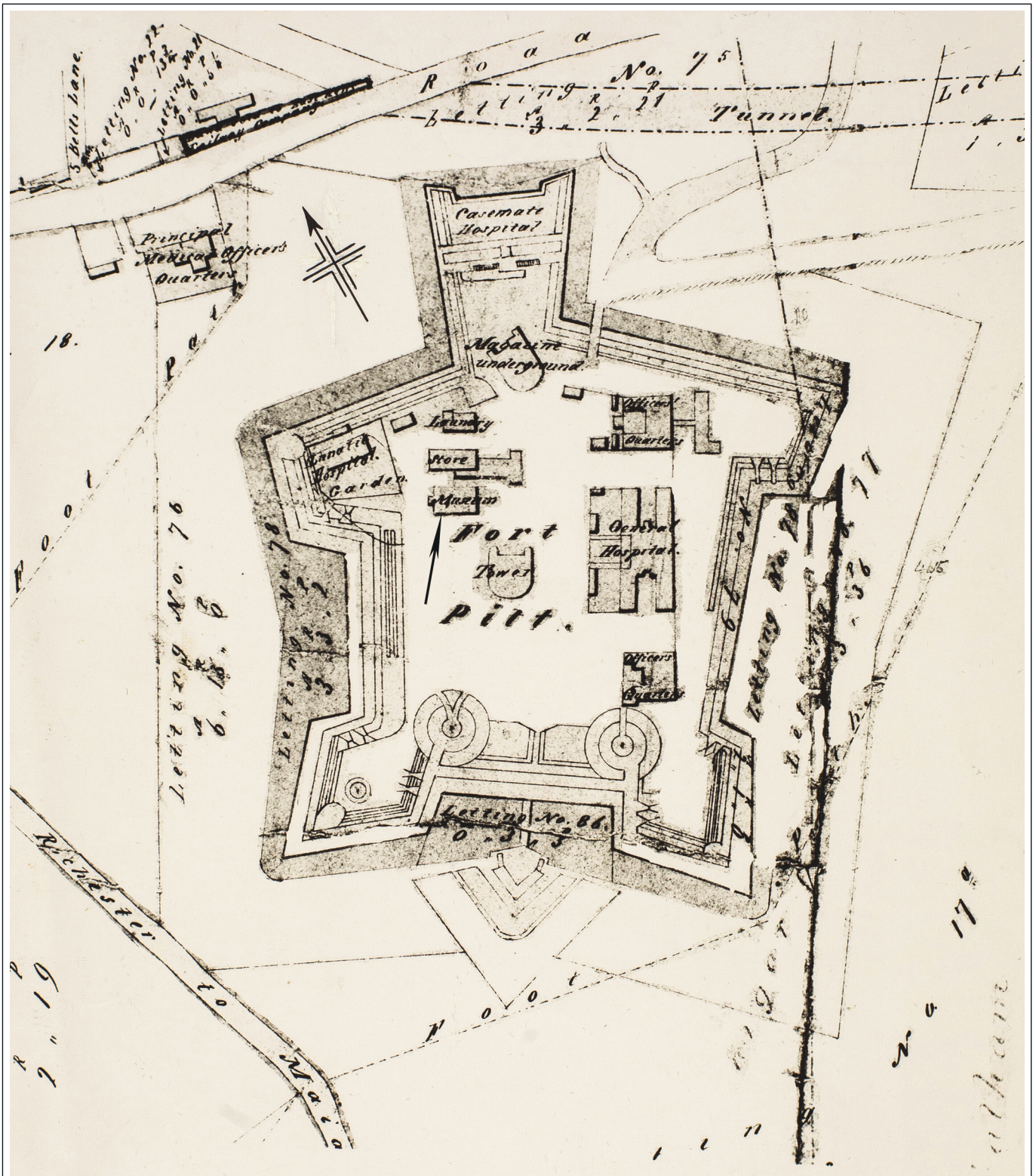


Fig. 1. Schema of Fort Pitt, Chatham, with the position of the Museum marked with an arrow. Image from Wellcome Collection: "Collection re the history of Fort Pitt, Chatham, and the Army Medical School", available at <https://wellcomecollection.org/works/r5q6nj92/items?canvas=7>.

Archibald Shanks and James Strachan. Seven were based in Bengal Presidency, which could be considered "North India"): Burke, J.F. Bacon, Duncan Menzies, Backshall Lane

Sandham, Robert Stevenson, William Ramsay White, plus Hutchinson. Four served in Bombay Presidency, in between the two in latitude, but on the west coast: William Jones,

Table 1. Collectors/donors of birds and mammals to the Fort Pitt Museum, Chatham. Details of people listed by Burton (1838) obtained from Johnston (1917) and annual Army Lists. Places of assignment are based on regimental histories (Anon 1868, 1870, 2008; Bannatyne, 1923; Brinckman, 1888; Brodigan, 1884; Burgoyne, 1883; Cannon, 1839a-c, 1841, 1842a-c, 1845, 1848a-e, 1849a-b, 1850, 1853; Cooper, 2004; Dalbiac, 1902; De Ainslie, 1887; Dyde, 1997; Freer, 1915; Fyler, 1895; Hayden, 1908; James, 1906; Jameson, 1863; Moorsam, 1860; Slack, 1884; Smythies, 1894; Sutherland, 1972; Swiney, 1893; Trimble, 1876; Wallace, 1879; Witting, 1878; Wyll, 1926), and annual Army Lists for General Staff positions. Year of death is given for those listed by Burton as deceased. Abbreviations: AIH – Assistant Inspector of Hospitals; AS – Assistant Surgeon; ASS – Staff Assistant Surgeon (“Assistant Surgeon to the Forces”); BMH – Bengal Medical Establishment; DGA – Director-General of Army Medical Department; DGIH – Deputy Inspector General of Hospitals; DIH – Deputy Inspector of Hospitals; IGH – Inspector General of Hospitals; PGN – Physician-General to the Navy; S – Surgeon; SS – Staff Surgeon (“Surgeon to the Forces”). Donors based in India in 1838 or before are in bold.

NAME/AFFILIATION IN BURTON (1838)	FULL NAME	RANK AMONG BIRD DONORS	RANK AMONG MAMMAL DONORS	POSTINGS PRIOR TO 1838
Dr Burke, IGH	William Augustus Burke	1	9	1796 Gibraltar (37th Regt); 1800 West Indies (37th Regt); 1811 Mauritius (DIH); 1825 India (Bengal) [d.1837, Calcutta]
Mr Leslie, AS, 45th Regt	Lewis Leslie	2		1826 Myanmar; 1830 India (Madras) [d.1834]
Sir James McGrigor, DGA	Sir James McGrigor	3		1815 England
Dr McLeod, IGH	Donald McLeod	4	4	1827 Australia (Sydney); 1829 India (Bombay); 1834 India (Madras)
Mr Bacon, Bengal Medical Establishment	?J.F. Bacon	5		India (Bengal)
Mr Munro, ASF	John Munro	6	3	1820 Canada; 1830 England; 1832 South Africa (Cape of Good Hope)
Mr Wyer, S, 19th Regt	John Wyer	7	8	1824 England (Isle of Wight, ASS); 1825 South Africa (Cape of Good Hope, ASS); 1831 England (Chatham, ASS); 1832 Canada (79th Regt); 1835 West Indies; 1836 Ireland
Mr Dumoulin, S, 50th Regt	James Andrew Du Moulin	8	21	1834 Australia (Sydney, Norfolk I, Tasmania)
Mr Morgan, AS, 55th Regt	Alexander Braithwaite Morgan	9		1825 South Africa; 1830 India (Madras)
Mr McGrigor Pink, Quebec	McGrigor Pink (son of John Freeborn Pink, S, Royal Newfoundland Veteran Companies)	10		1826 Canada (Quebec) – father was apothecary 1826, ASS 1831 in Quebec; S, RNVC 1837. McGrigor (b. 1814) was between 12 and 22 during the period his father was based in Quebec and presumably stayed there when his father was posted to Nova Scotia with the Veteran Companies.
Professor Jameson, Edinburgh	Professor Robert Jameson	11		Non-army; Scotland (University of Edinburgh)
Lady McGrigor	Lady Mary McGrigor, wife of Sir James	12		1810 England
Dr Skey, DGIH	Joseph Skey	13	17	1824 England (Chatham); 1830 Canada
Dr Gibson, New South Wales	Andrew Gibson	14	11	non-army; 1826 Australia (Sydney)
Mr Ford, AS, 72nd Regt	William Michael Ford	15		1827 Portugal (ASS); 1829 South Africa
Dr Shanks, S, 55th Regt	Archibald Shanks	16	19	1822 Mauritius (82nd Regt); 1835 India (Madras)
Mr Davidson, AS, 21st Regt	James Davidson	17		1825 West Indies; 1827 England/Ireland; 1833 Australia (Sydney, Tasmania)

NAME/AFFILIATION IN BURTON (1838)	FULL NAME	RANK AMONG BIRD DONORS	RANK AMONG MAMMAL DONORS	POSTINGS PRIOR TO 1838
Dr Stevenson, S, 3rd Regt	Robert Stevenson	18		1834 India (Bengal)
Mr Seaton, S, Chatham	Thomas Seaton	19		1813 England (Chatham, Ordnance Medical Dept)
Dr Lewis, S, 4th Regt	Thomas Lewis	20		1826 Corfu (18th Regt); 1830 England; 1832 Australia (various); 1837 India (Madras)
Dr Milligan, AS, 63rd Regt	William Milligan	21		1829 Australia (Sydney, Tasmania, West Australia); 1834 India (Madras)
Major-General Sir Lewis Grant	Sir Lewis Grant	22		1820 Bahamas (Governor); 1829 Trinidad (Governor)
Dr Mair, AS, 59th Regt	John Mair	23		1823 South Africa (Cape of Good Hope); 1828 Australia (Sydney, 39th Regt); 1833 England; 1836 Malta
Dr Davis, AS, 39th Regt	Robert Martin Davis	24		1825 Australia (Sydney, Tasmania, West Australia); 1832 India (Madras)
Dr John Arthur, DIGH	John Arthur	25	2	1818 West Indies (S, 60th Regt); 1825 South Africa (Cape of Good Hope); 1829 unassigned; 1836 Australia (Hobart)
Mr Burton, SS	Edward Burton	26	15	1813 Ireland (ASS, 12th Regt); 1818 England/Ireland (9th Lancers); 1826 England (Chatham)
Mr G McGrigor, AS, 50th Regt	Grigor McGrigor	27		1834 Australia (Sydney) [d.1835, Hobart]
Mr John Stewart, ASS	John Stewart	28		1834 Greece (Corfu)
Mr Parry, S, 1st Dragoon Guards	William Parry	29		1822 West Indies (4th Regt); 1828 England (4th Regt); 1832 Australia (4th Regt)
Mr Fraser, S, 60th Regt	Hugh Fraser	30	29	1825 Gibraltar (ASS); 1831 England (Chatham, ASS); 1833 Canada (ASS); 1835 Mediterranean
Mr McBride, Medical Staff, Jamaica	Michael McBride (Dispenser)	31		1827 Jamaica
Mr Menzies, AS, 16th Regt	Duncan Menzies	32	24	1830 Sierra Leone (ASS); 1833 India (Bengal)
Mr Hall, ASS	Andrew Halliday Hall	33		1836 Sri Lanka
Mr Chambers, S, 22nd Regt.	John Chambers	34	22	1824 Gibraltar (64th Regt); 1827 Ireland (64th Regt); 1834 Jamaica (64th Regt); 1837 Ireland
Dr Benza, Madras Medical Dept	Pasquale-Maria Benza	35	5	1826 Greece (Corfu, ASS); 1829 left army; 1837 India (Madras)
Mr Poole, AS, 32nd Regt	Richard Poole	36		1827 West Indies (27th Regt); 1830 Canada
Dr Baxter, IGH	Alexander Baxter	37		1818 St Helena; 1825 Canada (Nova Scotia); 1829 Barbados
Dr Mouatt, S, 13th Light Dragoons	James Mouat	38		1827 India (Madras) (14th Regt); 1829 India (Madras)

NAME/AFFILIATION IN BURTON (1838)	FULL NAME	RANK AMONG BIRD DONORS	RANK AMONG MAMMAL DONORS	POSTINGS PRIOR TO 1838
Dr Carter, ASS	John Collis Carter	39		1826 Canada (Nova Scotia); 1833 Barbados; 1836 Tobago
Mr Rolland, ASS	James Henderson Rolland	40		1830 England (Chatham, ASS); 1832 Australia (Sydney; 4th Regt); 1836 England (Chatham)
Mr Loinsworth, SS	Augustus Lewis Loinsworth	41		1823 West Indies; 1824 Trinidad, 1826 Demerara; 1828 Scotland (Glasgow); 1831 England (Bristol); 1836 Sri Lanka; 1837 India (Bombay)
Dr J. Clark, DIGH	John Clark	42		1822 England (Isle of Wight; AIH); 1827 England (Chatham)
Philosophical Inst. Chatham		43		
Dr Andrew Smith, SS	Sir Andrew Smith	44	6	1826 South Africa (Cape of Good Hope); 1837 England (Chatham)
Staff Sergeant Wells, Fort Pitt	?	45		England (Chatham)
Dr Jones, S, 40th Regt	William Jones	46		1823 Australia (Sydney, Tasmania); 1828 India (Bombay)
Captain McKay, 3rd Regt	Patrick McKie	47		1824 Burma (89th Regt); 1826 India (Madras, 89th Regt); 1827 (Madras)
Major-General Sir Leonard Greenwell	Sir Leonard Greenwell	48		1819 Sri Lanka (45th Regt); 1831 England (Chatham, Commandant)
Sir William Burnett, PGN	Sir William Burnett	49		1822 England (presumably linked through his establishment of the Melville Hospital, a naval hospital at Chatham, in 1828)
Rev Aylmer Farquhar	Rev Aylmer Farquhar	50		non-army; England (Rochester); [d.1835]. Connections via christening at Chatham; half-brother, Major-General William Farquhar.
Mr Edmonstone, AS, 30th Regt	Joseph Edmonson	51	30	1830 Barbados (ASS); 1832 Antigua (93rd Regt); 1834 Bermuda
William Swainson	William Swainson	52		non-army naturalist; 1806 Brazil; 1818 England
Dr Davy, AIH	John Davy	53		1818 Sri Lanka; 1824 Malta; 1826 Greece (Corfu); 1829 Malta; 1835 England (Chatham)
Dr Kinnis, ASS	John Kinnis		1	1825 England (Isle of Wight); 1826 Canada (Nova Scotia); 1827 Canada (Quebec); 1829 Sri Lanka
Mr Allman, Apothecary to the Forces	George Allmann		7	1829 Sierra Leone; 1830 Gibraltar; 1831 Jamaica
Dr Dyce, Aberdeen	Robert Dyce		10	non-army; 1824 Mauritius; 1830 South Africa; 1835 Scotland (Aberdeen)
Mr White, S, 16th Lancers	William Ramsay White		12	1825 India (Bengal, 31st Regt); 1830 India (Bengal)
Mr Draper, IGH	Thomas Draper		13	1825 Barbados; 1826 Demerara; 1829 Jamaica
Mr Hutchinson, AS, 11th Light Dragoons	John Hutchinson		14	1817 Trinidad (3rd West India Regt); 1827 England (62nd Regt); 1830 India (Madras, 62nd Regt); 1835 India (Bengal)
Dr Burrell, S, 76th Regt	William Henry Burrell		16	1827 England/Scotland (72nd Regt); 1831 Gibraltar (94th Regt); 1832 Malta (94th Regt); 1834 Malta (ASS); 1836 England (ASS); 1837 Malta

NAME/AFFILIATION IN BURTON (1838)	FULL NAME	RANK AMONG BIRD DONORS	RANK AMONG MAMMAL DONORS	POSTINGS PRIOR TO 1838
Dr Strachan, IGH	James Strachan		18	1827 India (Bombay); 1829 India (Madras); retired 1834
Dr Roe, S, 38th Regt	Samuel Crozier Roe		20	1819 England/Ireland (28th Foot); 1826 Mauritius (28th Foot); 1832 India (Madras)
Dr Athill, ASS	Robert Athill		23	1837 Jamaica
Mr White, S, Rifle Brigade	Moses White		25	1826 Barbados; 1827 Scotland (Edinburgh); 1828 Greece (Corfu); 1829 Malta; 1831 England
Dr Barry, S, 89th Regt	Samuel Barry		26	1825 Ireland/England (1st Dragoons); 1833 Ireland (7th Dragoon Guards); 1835 West Indies [d 1837, Portsmouth)
Dr J. F. Clarke, AIH	John Frederick Clarke		27	1821 Ionian Islands (ASS, 51st Regt); 1827 Sierra Leone (SS); 1830 hp; 1836 Malta
Dr Sandham, S, 11th Light Dragoons	Backshall Lane Sandham		28	1820 India (Bengal)

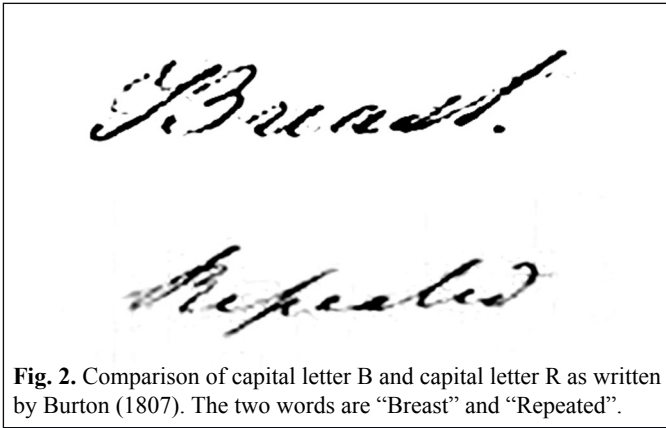


Fig. 2. Comparison of capital letter B and capital letter R as written by Burton (1807). The two words are “Breast” and “Repeated”.

Augustus Lewis Loinsworth, plus McLeod and Strachan who were also in Madras. Only Burke has a name vaguely similar to “Rurk”.

Burke was listed first in terms of numbers among the donors of birds to the collection, and ninth in terms of the number of mammals in the collection (Burton, 1838). He is also recorded as a significant donor in the first catalogue of the collection (Morbidity, Natural and Comparative Anatomy, Anon, 1833), and was also listed as a donor of specimens in the annual report of the previous year (Anon, 1832, for the year between May 1831 and May 1832). A large collection of Burke’s birds was reported on by Edward Burton, the curator of the natural history collections at Fort Pitt Museum between its foundation in 1816 (Anon, 1833; Burton, 1838) and 1837. Burton (1836) specifically noted that Burke was the donor of the collection of birds described in his paper, and that he “has enriched the Museum with an extensive collection in ornithology from Northern India”; from among them, he described a new species of warbler *Sylvia burkii* (now *Phylloscopus burkii*). Burton’s paper was read at a meeting of the Zoological Society of 27 October 1835, so Burke’s Himalayan bird specimens arrived at Chatham by then.

Hence, with Burke a major donor of specimens to the collection, and his collections being largely, if not entirely, from North India, the stated type locality for *Ristella rurkii*, it would seem that Gray’s “Dr Rurk” is most likely a misspelling of “Dr Burke”.

It is likely that Gray examined the Chatham collection in 1834, while Burton was still the curator. Gray’s (1839) description is silent (even uncertain) as to the scalation of his new taxon, stating “head shields —?”, suggesting he no longer had the specimen available to him for examination at the time of writing. There is a record in the volume “Trustees Manuscripts Donations 1823–1836, Volume 2” held in the library of the Department of Herpetology at the Natural History Museum of the United Kingdom (formerly the British Museum (Natural History), and prior to that part of the British Museum; BMNH) of the receipt on 13 December 1834 of 76 specimens of reptiles from the Army Medical Officers at Chatham. There is no subsequent trace of any specimens in the Natural History Museum from the Fort Pitt collection,

or from any of the donors to the Fort Pitt collection listed by Burton (1838), in catalogues of the British Museum herpetological collections published over the next 25 years (Gray, 1845; Günther, 1858), other than one specimen of *Pygopus squamiceps* Gray, 1845 (now *Pygopus lepidopodus* (Lacépède, 1804) from Australia donated by Dr Mair (Gray, 1845) and one specimen of *Leptodeira rufescens* (Gmelin, 1789) (now *Crotaphopeltis hotamboeia* (Laurenti, 1768)) from the Cape of Good Hope donated by Dr Dyce (Günther, 1858). This suggests that the collection of 76 specimens was subsequently returned to the Fort Pitt collection after identification. Further evidence for the retention of the types of the species described by Gray (1839) at Chatham comes from a comment made by Gray (1845: 100) relating to the species he named as *Dorfia punctata* in the earlier paper: “I have placed *Dorfia* in this genus, until I can again examine the specimen”.

Edward Burton (1790–11 March 1867), who retired on 15 September 1837, was immediately replaced as curator of the Fort Pitt collection by Sir Andrew Smith (Anon, 1837). Burton would presumably have provided the labelling on the jars in the collection at the time of Gray’s examination of the reptiles. His handwriting is preserved in a set of notes he wrote recording surgical lectures by Sir Everard Home in 1807, notes that were formerly in the collection of the Fort Pitt Museum, and are now in the Wellcome Collection (Burton, 1807). Burton’s written “B” is similar to his written “R” (Fig. 2), and hence it is possible that Gray could easily have either mis-transcribed the spelling of Burke as Rurk/Rurk, or misread his own notes subsequently. With the changeover of staff at the Fort Pitt Museum in the period 1837–1838, it is quite possible that Gray did not bother to confirm the spelling before writing his 1839 paper.

William Augustus Burke was born in or near 1769, one of three sons of Walter Burke, purser aboard H.M.S. *Victory*, Admiral Horatio Nelson’s flagship at the Battle of Trafalgar, and reputedly the person who held the dying Nelson (Beatty, 1807).

William first entered the Army as a Hospital Mate on September 13, 1795, aged 26, and was appointed Surgeon en Second to the 37th Regiment of Foot on 24 October 1795, then promoted to Surgeon on 15 November 1797 (Anon, 1797; Johnston, 1917).

During the period 1796 to 1799, the Regiment was stationed at Gibraltar (Whitting, 1878). While there, Burke was sent by the Gibraltar Governor, General Charles O’Hara, to attend the Emperor of Morocco as Physician (Holmes & Co., 1851). **His memorial tablet in Rochester Cathedral** also mentions service in Sicily, which presumably occurred before the regiment left Gibraltar.

In 1800, the 37th Regiment was transferred to the West Indies (Whitting, 1878), where Burke was promoted to Apothecary to the Forces on 7 September 1801, a promotion formalised in London on 26 January 1802 (Anon, 1802), followed by further promotion to Surgeon to the Garrison of Barbados (locally 5 May 1803, formalised 10 September; Anon, 1803),

then Deputy Inspector of Hospitals to the Windward and Leeward Charibbee Islands [sic; Caribbean], an appointment made on 19 July 1804, and formalised on 20 July 1804 (Anon, 1804; Johnston, 1917). On March 11 1809, he was promoted to Brevet Deputy-Inspector of Hospitals (Anon, 1809), a prelude to being transferred to Mauritius in 1811 (Anon, 1811), a colony newly taken by the British from French rule in 1810. Eight years later (17 July 1817, he was further promoted to Brevet Inspector of Hospitals (Anon, 1817, 1851).

While in Mauritius, he was honorary Director of the Botanic Gardens at Pamplemousse (Owadally, 1972), and it is likely that the catalogue of exotic plants in the garden there, lacking authorship (Anon, 1816) was by his hand. In August 1818, he is reported to have accompanied the missionaries David Jones and Thomas Bevan to Tamatave in Madagascar, as they established a mission there (Campbell, 2012, 2022). Burke was in Mauritius, prior to his visit to Madagascar, at the time of the visit of Louis de Freycinet's expedition aboard the *Uranie*, between 5 May and 16 July 1818, and one of the naturalists of that expedition, Paul Gaimard, mentions him on several occasions during his visit, in his unpublished diary (Gaimard, 2019). Gaimard mentions being shown around the Botanic Gardens by Burke on 12 June, a meeting with Burke and another local doctor on 19 June, Burke's interest in Gaimard's craniometric measurements on Mauritian residents, along with gifts of a mineral specimen and a copy of the catalogue of the gardens on 11 July, and on 14 July, Burke hosted Gaimard at lunch, and showed him "some beautiful coloured drawings of butterflies and fish of Mauritius, anatomical specimens, two recent cases of pericarditis, a Madagascar chameleon, crustaceans and fish, all preserved in alcohol; he has had built a shed in his garden that he plans to use for anatomical demonstrations." The breadth of Burke's natural history interests is evident.

Burke was also involved in reform of prison conditions (Anderson, 2008) and in control of the 1819 cholera outbreak (Anon, 1820) and leprosy (Anderson, 2000).

He left the position of Inspector of Hospitals in Mauritius on 25 September 1822, replaced by John McMullin (Anon, 1823; Johnston, 1917), and was placed on the half-pay roll until 23 December 1824, when he was returned to full pay (Anon, 1825a), becoming Inspector of Hospitals in India on 20 January 1825 (Anon, 1825b).

During the two years he was on the half-pay list, his activities are not recorded, although one obituary stated that he moved direct from Mauritius to Bengal (Holmes & Co., 1851).

Burke was the first appointment to the position of Inspector of Hospitals to what was then the East India Station, with headquarters at Fort William in Calcutta in Bengal Presidency (capital now Kolkata), and representation also in Madras Presidency (capital now Chennai) and Bombay Presidency (capital now Mumbai). Five years later, on 29 July 1830, his position became Inspector-General of Hospitals in India (Anon, 1830a, b). Burke died in Calcutta on 22 May 1837 (Holmes and Co., 1851; Buckland, 1906), with his reports on

the mortality of the English at the stations in Bengal Presidency published posthumously (Burke, 1839).

During his 12 years in India, he is most remembered today for his work on the infamous lock hospitals, which attempted to control the spread of venereal disease among the regiments by forcibly incarcerating infected prostitutes. Although initially supporting the lock hospital system, he later rejected their role in controlling disease, providing support for their abolishment by the then-Governor of India, Lord William Bentinck, in 1830 (Peers, 1998).

Burke's movements in India are not well recorded. However, as Inspector-General of Hospitals, the most senior administrative position in the Army Medical Service in India, he was presumably based at the Headquarters of the East India Station in Bengal Presidency. Two published letters from him (Burke, 1829, 1833) have the address Simla (now Shimla, in Himachal Pradesh state, India), the former Summer Headquarters of the Bengal Presidency. This place was used to escape the high temperatures and humidity of the cities on the plains. This matches the topic of the first letter, the consideration of Landour in Uttarakhand Province as a site for a convalescent station due to its altitude and cool climate, and the Himalayan/North Indian localities given for Burke's bird and mammal specimens in the Fort Pitt Museum (Burton, 1836, 1838; Anon, 1833). He was recorded as being present at the capture of Bharatpur in 1826 (Holmes and Co., 1851; Buckland, 1906), again a locality in northern India (Rajasthan state). The position of these localities is provided in Fig. 3.

This leaves unresolved the discrepancy between the North Indian locality for the type of *Ristella rurkii* and the distribution of the species that is restricted to southern India.

One possibility is that Burke, in studying the effects of cool climates on convalescence of ill officers, visited the Western Ghats directly, or obtained material through one of his staff in the area. The most likely source of *Ristella* specimens from the Western Ghats in that time would have been the Nilgiri Hills area. The Nilgiri Hills were proposed as the site for a sanatorium for Madras Presidency in 1827 (preamble to Burke, 1829), and the local Resident Medical officer at Ootacamund (now Udhagamandalam, Tamil Nadu state), Surgeon Haines, was appointed as superintendent, with the first hospital completed in 1830 (Francis, 1908; Price, 1908). A few years later, the Governor of India Lord William Bentinck, suffering from ill-health, spent six months between March and September 1834 at Ootacamund, running the country from that settlement (Price, 1908), with the assistance of the Governor of Madras Presidency, Sir Frederick Adam, and the Commander-in-Chief of the Madras Forces, Sir Robert O'Callaghan. This medical and administrative activity at Ootacamund at a time prior to Burke's death in 1837 would have provided a potential pathway for either Burke to have visited the area, or received specimens from one of his medical staff.

However, *Ristella rurkii*, in the current application of the name, is not known to occur so far north in the Western Ghats. It is presently known only from the Anaimalai and

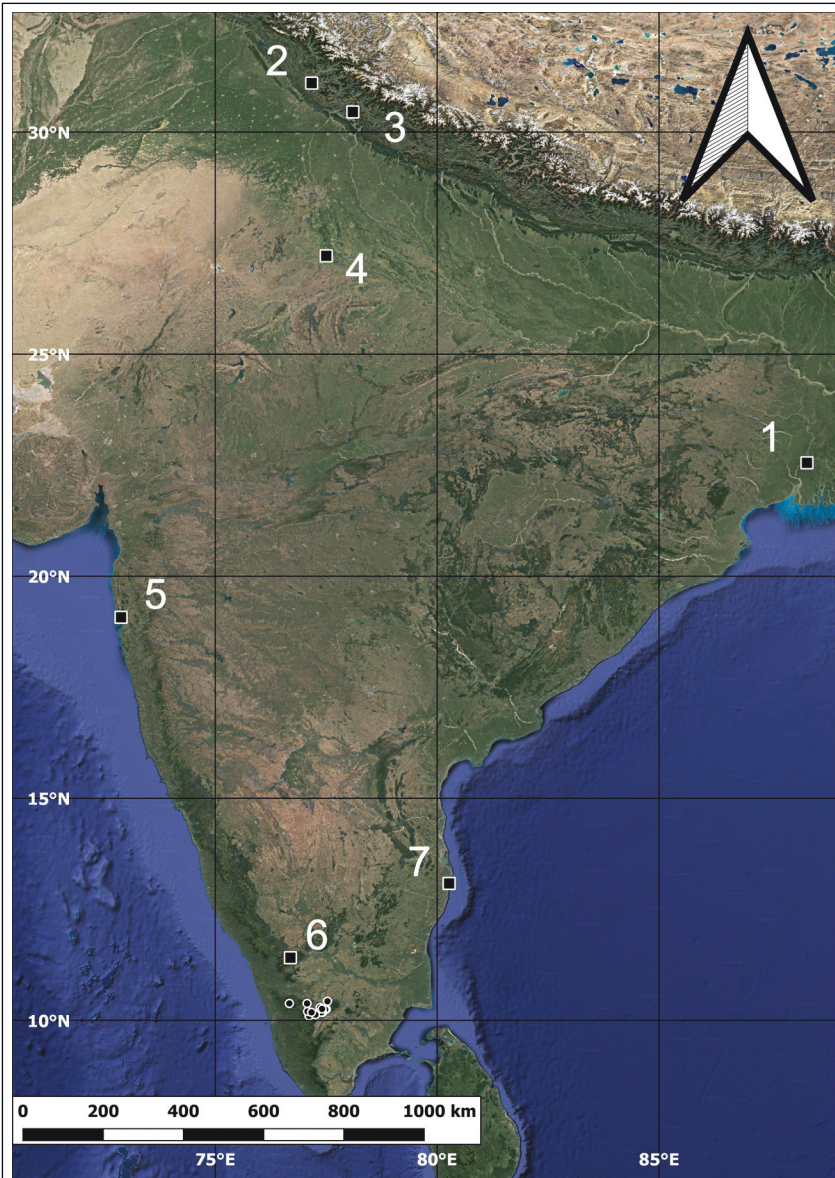


Fig. 3. Known distribution of *Ristella rurkii* (circles) with comparison to localities associated with William Augustus Burke and mentioned in the paper. 1 = Fort William, Calcutta, where Burke was based as head of the medical service for the East India Station; 2 = Shimla (= “Simla”) from where Burke wrote letters, and to where he apparently retreated to escape the oppressive climate at Calcutta; 3 = Landour, where Burke was proposing a convalescent station; 4 = Bharatpur, where Burke as reported present in 1826; 5 = Mumbai (former Bombay) where other medical officers were based; 6 = Udhagamandalum (former Ootacamund), where Lord William Bentinck, Governor of India, spent six month convalescing in 1834; 7 = Chennai (former Madras), where other medical officers were based. Localities for *Ristella rurkii* are based on Roux (1928), Ganesh (2018) and Deuti et al. (2020), specimens in the NHMUK collection, and other specimen records from Vertnet (held in California Academy of Sciences, Museum of Comparative Zoology, Harvard, and Museum National d’Histoire Naturelle, Paris).

Palni Hills, parts of the southern Western Ghats (Ganesh et al., 2018; Deuti et al., 2020), areas which had barely been visited by any British explorer prior to Burke’s death in 1837. Kodaikanal, the largest town in the Palni Hills, was first established in 1845 (Mitchell, 1972), and the Anaimalai Hills were first explored as a potential site for establishment of

another sanatorium in 1858 (Cleghorn, 1862), and with the first settlement by Europeans by John Munro and the Turner brothers, the founders of the North Travancore Land Planting and Agricultural Society, in 1879 (Suresh et al., 2018).

In contrast, *Ristella beddomei* Boulenger, 1887 is known to occur in the Nilgiri Hills (Deuti et al., 2020), raising the possibility that the name *Ristella rurkii*, a species for which the holotype is now lost, has been misapplied.

The description of *Ristella rurkii* by Gray (1839) is brief, and based largely on coloration, reading just “RISTELLA. Toes 4–5, short; ears distinct; head shields — ? *Ristella Rurkii*. Crown and back pale brown, shining; scales 6-rowed, each of four central rows with a blackish central spot, forming four longitudinal series of spots; sides white-dotted; chin and belly white.” The redescription of the species by Gray (1845) is barely more detailed, reading “RISTELLA, Gray. Muzzle conical. Supranasal — ? Ears distinct, suborbicular, sunken. Lower eyelid — ? Body and tail elongate, subcylindrical, the latter tapering at the end. Legs 4, weak, far apart. Toes 4–5, compressed, front very short, hinder unequal. RURK’S RISTELLA. *Ristella Rurkii*. Gray, *Ann. N. H.* ii. 333. Crown and back pale brown, shining; scales 6-rowed, each of those in the 4 central rows with a black central spot, forming 4 longitudinal series of spots; sides ashy, white-dotted; chin and belly white; tail similar, but rather paler, nearly as long as the body.” Neither description gives features that would allow unequivocal distinction of *R. rurkii* from *R. beddomei*. Indeed, neither description gives any features that would confidently allow identification of the species as what is currently a member of the genus *Ristella*, other than the digital formula of four fingers and five toes. Further, the description of the ear opening as “suborbicular, sunken” is suspicious, given that *Ristella* have tiny ear openings, partly covered by the large anterior scales.

Gray (1839) placed *Ristella* among a series of eight genera that were grouped together on the basis of the suite of characters “muzzle rounded; body subcylindrical, elongate; limbs 4, far apart”. These genera were *Riopa* Gray, 1839, including the species *R. punctata* (Gray, 1831) (now *Riopa punctata* (Linnaeus, 1758)), *R. ruppellii* Gray, 1839 (now *Ablepharus ruppellii*) and *R. Brougainvillii* Gray, 1839 (now *Lerista brougainvillii* (Gray, 1839)); *Lygosoma* Hardwicke and Gray, 1827, including the species *L. abdominalis* (Thunberg, 1787)

(now *Lygosoma quadrupes* (Linnaeus, 1766)) and *L. australis* Gray, 1839 (now *Hemiergis gracilipes* (Steindachner, 1870)); *Chiamela* Gray 1839, including the species *C. lineata* Gray, 1839 (now *Riopa lineata*) and *C. duvaucellii* Gray, 1839 (now *Hemiergis peronii* (Gray, 1831)); *Tetradactylus* Cuvier, 1829, a monotypic genus for *Te. decresiensis* Cuvier, 1829 (now *Hemiergis peronii* (Gray, 1831)); *Hagria* Gray, a monotypic genus for *H. vosmaerii* Gray, 1839 (now *Riopa vosmaerii*), *Tridactylus* Cuvier, 1829, a monotypic genus for *Tr. decresiensis* Cuvier, 1829 (now *Hemiergis decresiensis*), *Seps* Merrem, 1820, including the species *S. tridactylus* (Laurenti, 1768), (now *Chalcides chalcides* (Linnaeus, 1758)), *S. vittata* (Leuckart, 1828) (likewise now *Chalcides chalcides*) and *S. multivirgatus* Boie (a nomen nudum), and *Siaphos* Gray, 1839, a monotypic genus for *S. equalis* (Gray, 1825). All of these species are very elongate skinks with very widely separated short limbs, much more so than any species of *Ristella*.

This further raises the possibility that the *Ristella rurkii* was originally based on a specimen not even congeneric with the current application of the name, and that hence Burke's original locality of North India may indeed be correct. In the absence of the holotype, the only character states available to determine the original application of the name are the very elongate body and short limbs, with four fingers and five toes. However, there are no elongate skinks with widely spaced, short limbs, but four fingers and five toes, in North India. The Indian species formerly ascribed to *Lygosoma* have been recently redistributed between *Dravidoseps*, *Riopa* and *Subdoluseps* (Freitas et al., 2021; Agarwal et al., 2024). Of these species, *R. albopunctata* (Gray, 1846), *R. guentheri* (Peters, 1879), *Riopa punctata* (Gmelin, 1799), *Subdoluseps bowringi* (Günther, 1864), *D. goaensis* (Sharma, 1976), *D. nilgiriensis* (Ganesh et al., 2021) and *D. pruthi* (Sharma, 1977), as well as the five new *Dravidoseps* species described by Agarwal et al. (2024), are pendadactyle on both front and hind limbs, *R. lineata* (Gray, 1839) is tetradactyle on both front and hind limbs, and *Riopa vosmaeri* (Gray, 1839) has pentadactyle front limbs and tetradactyle hind limbs. There are three other elongate burrowing skink genera of India. *Barkudia* and *Sepsophis* lack limbs or have only a trace of a front limb lacking digits, while the single Indian species of *Ophiomorus* is tridactyle. All other Indian skinks other than *Ristella* are pendadactyle on front and hind limbs. Hence, it can be concluded, if the species is from India, that the type of *Ristella rurkii* was a member of what is currently called *Ristella*, or that it was an abnormal specimen with loss of one digit on the front limb of one of the pentadactyle lygosomins. A similar case of an anomalous specimen was recorded with one of the Australian *Lerista* species, where the holotype of *Lygosoma goerlingi* Ahl, 1935, described as having two fingers on the front limb, is a specimen of the tridactyle *Lerista timida* with damage to both front limbs, lacking the manus on one side, and having only two fingers on the other (Shea, 1991).

It is important to remember that the subsequent application of the name *Ristella rurkii* to the species now known by

that name was made without reference to the type. The first mention of the species subsequent to the brief accounts of Gray (1839, 1844, 1845) is the mention of the discovery of a new species of *Ristella* by Beddome, reported by Stoliczka (1871), who noted in an abstract that the new species was to be named *Ristella malabarica* (a nomen nudum). Beddome (1870) described *Ateuchosaurus travancoricus*, from specimens from "Travancore Hills, Wynad, and the Anamallays up to 5000 feet", and redescribed the species the following year Beddome (1871) as *Ristella travancorica*, noting that the species was common in the "moist jungles" of the Western Ghats between 2000 and 5000 feet. However, while his original description reported the body scales to be bicarinate, Beddome's redescription noted that his material showed variation in the scale carination, from completely smooth to strongly bicarinate, suggesting that by 1871, his collections included more than one species under the name *travancorica*. In the formal publication of the full paper from Stoliczka (1872), he claimed to have advised Beddome that the species was a *Ristella*, and further redefined the genus, noting for the first time the retractile claws of the genus. Stoliczka's redefinition was based on a specimen of *R. travancorica* given to him by Beddome. However, Stoliczka also noted that he was unsure that *travancorica* was distinct from *rurkii*, stating "at least it is impossible to identify both from the short description given of *R. Rurkii*...". Stoliczka's specimen was described as having bicarinate scales, a distinct pair of widely separated prefrontals (using the old terminology of postfrontals for the prefrontals, prefrontal for the frontonasal, and vertical for the frontal), 26 midbody scales, and 36 scales between fore and hind limbs, and hence is likely to be *R. travancorica* on current definitions of that species.

Beddome donated other *Ristella* specimens to the British Museum. These were registered, and presumably received, as three batches. In the first collection were 17 specimens, presented by Beddome as types of *R. travancorica*, and bearing just the locality Western Ghats (originally registered as 74.4.29.435–451, now reregistered as 1946.8.2.55–71) and a further five specimens, also considered part of the type series of *R. travancorica*, with locality Toracada Valley, Anamallays, 4000–5000ft (originally registered as 74.4.29.1328–1331, now reregistered as 1946.8.15.64–68). Beddome's next *Ristella* was a single specimen from Madura, Sirimallay Hills (now Madurai, Sirumallai Hills, Tamil Nadu state) registered as 80.11.24.5 (reregistered as 1946.8.18.91), and his final donations were a further eight specimens from the same locality (original registration numbers 82.5.22.133–141, reregistered as 1946.8.18.92–99) along with 11 specimens from Sharavati River, North Kanara, registered as 82.5.22.142–152. Boulenger (1887), the first to report on these new specimens, described two new species, *R. guentheri* based on the specimens from Madurai and *R. beddomei* based on the Sharavati River specimens, but also (like Günther, 1875), reidentified the Toracada Valley specimens as *R. rurkii*, the first assignment of this name to specific specimens since Gray's original descriptions.

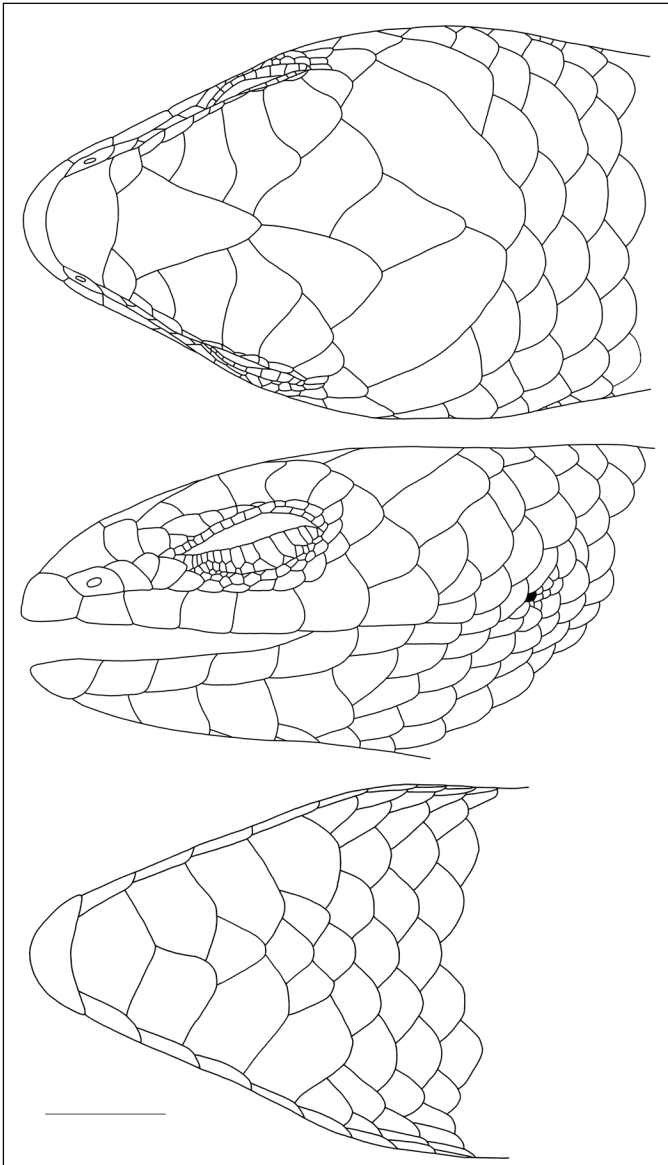


Fig. 4. Dorsal, left lateral and ventral views of the head scalation of the neotype of *Ristella rurkii* Gray, 1839, BMNH 1946.8.15.67. Scale bar = 2 mm.

Ganesh (2018) listed the five specimens from Toracada Valley (BMNH 1946.8.15.64–68) as types of *Ristella rurkii*. However, as noted by Boulenger (1887), these five specimens are part of the type series of *Ristella travancorica* Beddome 1870, and represent misidentified specimens of *Ristella rurkii* among the types of *R. travancorica*, rather than being types of *R. rurkii* itself. Beddome, the donor of the specimens, was just 8 years old and still at school in England at the time of description of *R. rurkii* (Adler, 2007).

Given the discrepancy between the nominal type locality and the known distribution of *Ristella rurkii*, the poor original description, and the uncertainty as to whether the description fits the species to which the name is applied, a neotype is required to fix the name to a specific taxon due to the loss of the original holotype. With *Ristella rurkii* being the type spe-

cies of the genus, it is even more important to fix the name to a species. It would seem to be most appropriate to designate one of the specimens that has incorrectly been considered an original syntype, and which has provided the basis for subsequent definitions of the species. Hence, I designate BMNH 74.4.29.1330, now reregistered as 1946.8.15.67, from Toracada Valley, Annamallays, collected by Richard Beddome, as neotype (Figs. 4,5). The given locality has been subsequently identified as Thorakadavu near Aliyar in Anaimalai (Ganesh, 2018), although others have failed to locate a place by that name near Aliyar (A. Ghosh, A. Datta-Roy, pers. comm.).

Seven criteria are required to be fulfilled for valid neotype designation under the Code of Zoological Nomenclature (Article 75.3):

- 75.3.1. a statement that it is designated with the express purpose of clarifying the taxonomic status or the type locality of a nominal taxon;
- 75.3.2. a statement of the characters that the author regards as differentiating from other taxa the nominal species-group taxon for which the neotype is designated, or a bibliographic reference to such a statement;
- 75.3.3. data and description sufficient to ensure recognition of the specimen designated;
- 75.3.4. the author's reasons for believing the name-bearing type specimen(s) (i.e. holotype, or lectotype, or all syntypes, or prior neotype) to be lost or destroyed, and the steps that had been taken to trace it or them;
- 75.3.5. evidence that the neotype is consistent with what is known of the former name-bearing type from the original description and from other sources; however, a neotype may be based on a different sex or life stage, if necessary or desirable to secure stability of nomenclature;
- 75.3.6. evidence that the neotype came as nearly as practicable from the original type locality and, where relevant, from the same geological horizon or host species as the original name-bearing type;
- 75.3.7. a statement that the neotype is, or immediately upon publication has become, the property of a recognized scientific or educational institution, cited by name, that maintains a research collection, with proper facilities for preserving name-bearing types, and that makes them accessible for study.

Of these, the first and last have already been covered. To fulfil the second criterion, I refer to Boulenger (1887) and Deuti et al. (2020), noting that the neotype possesses the diagnostic character state combination of retractile claws, small ear opening, prefrontals present and widely separated, and dorsal body scales very slightly carinate. The photograph and illustration of the head shields of the neotype, along with the registration tag, are sufficient to ensure recognition of the specimen. As previously noted, the Fort Pitt Museum collection is lost, and it is likely that the holotype was lost early on,



Fig. 5. Neotype of *Ristella rurkii* Gray, 1839, BMNH 1946.8.15.67, in left dorsolateral view.

as the published listing of the reptile collection (Anon, 1843) lacks any mention of the species. Indeed, it is apparent that there was significant loss of the reptiles in the collection by that date, as earlier listings of reptile specimens report additions of 120 specimens in the year to May 1832, of another 76 specimens in the following year, giving at the latter date 421 reptile specimens out of a total of 3864 zoological specimens in the collection (Anon, 1832, 1833). By 1838 (Burton, 1838), the zoology collection had grown to 9386. If the reptiles made up a similar proportion of the collection as in 1832 and 1833, the reptiles would have been of the order of 1,000 specimens (Shea, 2024). Yet by 1843, only 262 reptile and amphibian species are listed as present (Anon, 1843), and most of the reptile species described from material in the Fort Pitt Museum are absent from that catalogue. Fulfilling criterion 5, the original description lacks sufficient data to clearly identify the species, but the neotype is one of the specimens that has been subsequently used to characterise the species (Boulenger, 1887). As noted previously, the given type locality does not match the distribution of the species to which the name has consistently been applied, and hence it is not possible to designate a neotype from the type locality (“North India”). Instead, the neotype is from the northern end of the limited distribution of *Ristella rurkii* (thus, “as nearly as is practicable from the original type locality”; criterion 6).

Sadly, having died in 1837, Burke never knew about the lizard named for him in 1839, and as there is no evidence within the original description (Gray, 1839) for an error in creation of the name, there is no scope under the Code of Zoological Nomenclature to emend the name (Article 32.5).

ACKNOWLEDGEMENTS

I thank Colin McCarthy and Patrick Campbell for allowing me use of the facilities at the Natural History Museum of the United Kingdom on many occasions, Dane Trembath for creating the map, and Avrajjal Ghosh, Aniruddha Datta Roy and Aaron Bauer for comments on the manuscript.

REFERENCES

- Adler, K. 2007. Herpetologists of the past, part 2. Pp. 3-275 In: Adler, K. (ed.). *Contributions to the History of Herpetology*. Vol. 2. Society for the Study of Amphibians and Reptiles, St Louis. 389 pp.
- Agarwal, I., Thackeray, T. & Khandekar, A. 2024. A non-adaptive radiation of viviparous skinks from the seasonal tropics of India: systematics of *Subdoluseps* (Squamata: Scincidae), with description of a new genus and five cryptic new species. *Vertebrate Zoology* 74:23–83.
- Ahl, E. 1935. Beschreibung einer neuen Eidechse aus Westaustralien. *Zoologischer Anzeiger* 112:204–205.
- Anderson, C. 2000. *Convicts in the Indian Ocean. Transportation from South Asia to Mauritius, 1815–53*. MacMillan Press, Basingstoke. xii + 192 pp.
- Anderson, C. 2008. The politics of punishment in colonial Mauritius, 1766–1887. *Cultural and Social History* 5(4):411–422.
- Anon 1797. War-Office, December 26, 1797. *London Gazette* (14076):1221–1222 (26 December, 1797).
- Anon 1802. War-Office, January 26, 1802. *London Gazette* (15447):82 (23 January 1802).
- Anon 1803. War-Office, September 10, 1803. *London Gazette* (15618):1173–1179 (6 September, 1803).

- Anon 1804. War-Office, July 20, 1804. *London Gazette* (15720):875–877 (17 July, 1804).
- Anon 1809. War-Office, March 11, 1809. *London Gazette* (16235):305–307 (7 March, 1809).
- Anon 1811. War-Office, July 30, 1811. *London Gazette* (16508):1457–1458 (27 July, 1811).
- Anon 1816. *A catalogue of the exotic plants cultivated in the Mauritius, at the Botanic Garden, Pamplémousses, Monplaisir, Reduit, and other places. To which are added, their English and French names, native places of growth, by whom introduced, and the epoch of their introduction, as far as can be ascertained, &c. &c.* Baron & Souvignec, Mauritius. 31 pp.
- Anon 1817. War-Office, 23d August 1817. *London Gazette* (17279):1806–1807 (23 August 1817).
- Anon 1820. Cholera Morbus. *Asiatic Journal and Monthly Miscellany* 10:303–305, 402–404.
- Anon 1823. *The Army List for January, 1823*. War Office, London. 84 pp.
- Anon 1825a. War-Office, 7th January 1825. *London Gazette* (18097):41–42 (8 January 1825).
- Anon 1825b. War-Office, February 11, 1825. *Edinburgh Gazette* (3308):27–28 (15 February 1825).
- Anon 1830. War-Office, 28th September 1830. *London Gazette* (18730):2047–2049 (28 September 1830).
- Anon 1832. Report on the Fort Pitt Museum and Collections. *Edinburgh Medical and Surgical Journal* 38(112):221–224.
- Anon 1833. *Catalogue of Preparations, &c. in Morbid, Natural, and Comparative Anatomy, contained in the Museum of the Army Medical Department, Fort Pitt, Chatham*. Richard Taylor, London. xvi + 269 pp.
- Anon 1837. War-Office, 15th September 1837. *London Gazette* (19541):2426–2427.
- Anon 1843. *A Catalogue of the Reptiles contained in the Museum in the Medical Department of the Army, Fort Pitt, Chatham*. James Burrill, Chatham. [i] + 17 pp.
- Anon 1868. Historical Record of the services of the Ninety-Fourth Regiment. *Colburn's United Service Magazine, and Naval and Military Journal* 1868(3):243–257; 562–582.
- Anon 1870. The Old Springers. A Historical Sketch of the 62nd Regiment. *Colburn's United Service Magazine, and Naval and Military Journal* 1870(1):317–324.
- Anon 2008. 1685 to 1899 – A Short History of 1st The Queen's Dragoon Guards.
- Bannatyne, N. 1923. *History of the Thirtieth Regiment now the First Battalion East Lancashire Regiment 1689–1881*. Littlebury Bros, Liverpool. ix + 474 pp.
- Beatty, W. 1807. *Authentic Narrative of the Death of Lord Nelson: with the circumstances preceding, attending, and subsequent to, that event; the professional report on his Lordship's wound, and several interesting anecdotes*. T. Cadell & W. Davies, London. 99 pp.
- Beddome, R.H. 1870. Descriptions of some new lizards from the Madras Presidency. *Madras Monthly Journal of Medical Science* 1:30–35 + pl. I–II.
- Beddome, R.H. 1871. Descriptions of new Reptiles from the Madras Presidency. *Madras Monthly Journal of Medical Science* 4(24):401–404.
- Beolens, B., Watkins, M. & Grayson, M. 2011. *The Eponym Dictionary of Reptiles*. Johns Hopkins University Press, Baltimore. xiii + 296 pp.
- Boulenger, G.A. 1887. *Catalogue of the lizards in the British Museum (Nat. Hist.) III. Lacertidae, Gerrhosauridae, Scincidae, Anelytropsidae, Dibamidae, Chamaeleontidae*. Trustees of the British Museum, London. xii + 575 pp + 40 pl.
- Boulenger, G.A. 1890. *The Fauna of British India, Including Ceylon and Burma. Reptilia and Batrachia*. Taylor & Francis, London. xviii + 541 pp.
- Brinckman, R. 1888. *Historical Record of the Eighty-Ninth, Princess Victoria's, Regiment 1793–1888*. Gale & Polden, Chatham. 235 pp.
- Brodigan, F. 1884. *Historical records of the Twenty-Eighth North Gloucestershire Regiment, from 1692 to 1882*. Blackfriars Printing & Publishing Co., London. iv + 232 pp.
- Buckland, C.E. 1906. *Dictionary of Indian Biography*. Swan Sonnenschein & Co., Bloomsbury. xii + 494 pp.
- Burgoyne, R.H. 1883. *Historical Records of the 93rd Sutherland Highlanders, now the 2nd Battalion Princess Louise's Argyll and Sutherland Highlanders*. Richard Bentley & Son, London. x + 430pp.
- Burke, W.A. 1829. On the establishment of an invalid depot in the Himalayah Mountains. *Edinburgh New Philosophical Journal* 9(2):287–291.
- Burke, W.A. 1833. Observations on the mortality, from various diseases, among His Majesty's Troops in India, confirmed by tabular statements and returns, extending from 1826 to 1832. *Edinburgh Medical and Surgical Journal* 41(119):386–393.
- Burke, W.A. 1839. Report on the mortality among officers and men in H. M. Service in Bengal, and on the comparative salubrity of different stations. *Journal of the Asiatic Society of Bengal* 8(1):48–70.
- Burton, E. 1807. *Notes of the Lectures given at St. George's Hospital by Everard Home Esqr. Vols. 1-2*. Manuscript, Wellcome Collection, London. Volume 1: RAMC/295: Box 30; reference number: b18947839. Volume 2: RAMC/515: Box 104; reference number: b18681359.
- Burton, E. 1836. Characters of several birds from the Himalayan Mountains. *Proceedings of the Zoological Society* 3:152–154.
- Burton, E. 1838. *A Catalogue of the Collection of Mammalia and Birds in the Museum of the Army Medical Department, at Fort Pitt, Chatham*. James Burrill, Chatham. x + 48 pp.
- Campbell, G. 2012. *David Griffiths and the Missionary "History of Madagascar"*. Studies in Christian Mission 41. E.J. Brill, Leiden. xxi + 1177 pp.
- Campbell, G. 2022. *The Madagascar Youths. British Alliances and Military Expansion in the Indian Ocean Region*. Cambridge University Press, Cambridge. xvi + 319 pp.
- Cannon, R. 1839a. *Historical Record of the Third Regiment of Foot, or The Buffs; formerly designated The Holland Regiment. Containing an account of its origin in the reign of Queen Elizabeth, and of its subsequent services to 1839*. Longman, Orme & Co., London. xiv + 281 pp.
- Cannon, R. 1839b. *Historical Record of the Fourth, or the King's Own, Regiment of Foot; containing an account of the formation of the regiment in 1680, and of its subsequent services to 1839*. Longman, Orme and Co., London. x + 152 pp.
- Cannon, R. 1839c. *Historical Record of the Seventh, or Princess Royal's Regiment, of Dragoon Guards: containing an account of the formation of the regiment in 1688; and of its subsequent services to 1839*. Longman, Orme & Co., London. vi + 98 pp.
- Cannon, R. 1841. *Historical Record of the Ninth, or the Queen's Royal Regiment of Light Dragoons; Lancers: containing an account of the formation of the regiment in 1715, and of its subsequent services to 1841*. John W. Parker, London. vii + 72 pp.

- Cannon, R. 1842a. *Historical Record of the Eleventh, or the Prince Albert's Own, Regiment of Hussars: containing an account of the formation of the regiment in 1715, and of its subsequent services to 1842*. John W. Parker, London. viii + 107 pp.
- Cannon, R. 1842b. *Historical Record of the Thirteenth Regiment of Light Dragoons; containing an account of the formation of the regiment in 1715, and of its subsequent services to 1842*. John W. Parker, London. viii + 96 pp.
- Cannon, R. 1842c. *Historical Record of the Sixteenth, or the Queen's Regiment of Light Dragoons, Lancers: containing an account of the formation of the regiment in 1759, and of its services to 1841*. John W. Parker, London. viii + 120 pp.
- Cannon, R. 1845. *Historical Record of the Fourteenth, or, the Buckinghamshire Regiment of Foot: containing an account of the formation of the regiment in 1685, and of its subsequent services to 1845*. Parker, Furnivall, and Parker, London. viii + viii + 106 pp.
- Cannon, R. 1848a. *Historical Record of the Twelfth, or the East Suffolk, Regiment of Foot, containing an account of the formation of the regiment in 1685, and of its subsequent services to 1847*. Parker, Furnivall & Parker, London. xxxi + 103 pp.
- Cannon, R. 1848b. *Historical Record of the Sixteenth, or, the Bedfordshire Regiment of Foot; containing an account of the formation of the regiment in 1688, and of its subsequent services to 1848*. Parker, Furnivall, & Parker, London. xxviii + xix + 45 pp.
- Cannon, R. 1848c. *Historical Record of the Eighteenth, or the Royal Irish Regiment of Foot; containing an account of the formation of the regiment in 1684, and of its subsequent services to 1848*. Parker, Furnivall, and Parker, London. xxxvi + 91 pp.
- Cannon, R. 1848d. *Historical Record of the Nineteenth, or the First Yorkshire North Riding Regiment of Foot; containing an account of the formation of the regiment in 1688, and of its subsequent services to 1848*. Parker, Furnivall, & Parker, London. xxx + 40 pp.
- Cannon, R. 1848e. *Historical Record of the Seventy-Second Regiment, or, the Duke of Albany's Own Highlanders; containing an account of the formation of the regiment I 1778, and of its subsequent services to 1848*. Parker, Furnivall, & Parker, London. xxxi + 72 pp.
- Cannon, R. 1849a. *Historical Record of the Twenty-First Regiment, or the Royal North British Fusiliers, containing an account of the formation of the regiment in 1678, and of its subsequent services to 1849*. Parker, Furnivall, & Parker, London. xxxvii + 64 pp.
- Cannon, R. 1849b. *Historical Record of the Twenty-Second, or the Cheshire Regiment of Foot. Containing an account of the formation of the regiment in 1689, and of its subsequent services to 1849*. Parker, Furnivall, & Parker, London. xxxv + 64 pp.
- Cannon, R. 1850. *Historical Record of the Thirty-First, or, the Huntingdonshire Regiment of Foot; containing an account of the formation of the regiment in 1702, and of its subsequent services to 1850: to which is appended, an account of the services of the Marine Corps, from 1684 to 1748*. Parker, Furnivall, & Parker, London. xlv + 231 + xxxiv + 56 pp.
- Cannon, R. 1853. *Historical Record of the Thirty-Ninth, or the Dorsetshire Regiment of Foot: containing an account of the formation of the regiment in 1702, and of its subsequent services to 1853*. George E. Eyre & William Spottiswood, London. xii + 128 pp.
- Cleghorn, H. 1862. Notes of excursions to the higher ranges of the Anamalai Hills, South India, in 1858 and 1859. *Proceedings of the Royal Society of Edinburgh* 4:460–463.
- Cooper, D. 2004. *Knotted Together. The Staffordshire Regiments: 1705–1919*. Churnet Valley Books, Leek. 160 pp.
- Cuvier, [J.L.N.F.] 1829. *Le Règne Animal distribué d'après son organisation, pour servir de base à l'histoire naturelle des animaux et d'introduction à l'anatomie comparée. Tome II*. Second Edition. Déterville et Crochard, Paris. xv + 406 pp.
- Dalbiac, H.C. 1902. *History of the 45th: 1st Nottinghamshire Regiment (Sherwood Foresters)*. Swan Sonnenschein & Co., London. viii + 255 pp.
- De Ainslie, C.P. 1887. *Historical Record of the First or the Royal Regiment of Dragoons containing an account of its formation in the reign of King Charles the Second, and of its subsequent services to the present time*. Chapman & Hall, London. xiv + 311 pp.
- Deuti, K., Raha, S., Bag, P., Debnath, S., Srikanthan, A.N. & Chandra, K. 2020. *Skinks of India*. Zoological Survey of India, Kolkatta. iv + 383 pp.
- Dyde, B. 1997. *The Empty Sleeve. The Story of the West India Regiments of the British Army*. Hansib Caribbean, St Johns. 288 pp.
- Francis, W. 1908. *The Nilgiris*. Government Press, Madras. xiii + 394pp.
- Freer, W.J. 1915. The Thirty-Eighth Regiment of Foot, now the First Battalion of the South Staffordshire Regiment. *British Numismatic Journal* 11:289–316.
- Freitas, E.S., Datta-Roy, A., Karanth, P., Grismer, L.L. & Siler, C.D. 2021. Multilocus phylogeny and a new classification for African, Asian and Indian supple and writhing skinks (Scincidae: Lygosominae). *Zoological Journal of the Linnean Society* 186:1067–1096.
- Fyler, A.E. 1895. *The History of the 50th or (The Queen's Own) Regiment from the earliest date to the year 1881*. Chapman & Hall, London. xviii + 380 pp.
- Gaimard, J.-P. 2019. Extracts from “Voyage to the southern hemisphere and around the world. ‘Journal Historique’ of Joseph-Paul Gaimard retained naval surgeon”. (translated by John Milsom). Manuscript. State Library of Western Australia ACC 9989AD/2.
- Ganesh, S.R. 2018. The rediscovery of Rurk's Cat Skink *Ristella rurkii* Gray, 1839 (Reptilia: Ristellidae) with remarks on distribution and natural history. *Journal of Threatened Taxa* 10(10):12376–12381.
- Ganesh, S.R., Srikanthan, A.N., Ghosh, A., Adhikari, O.D., Kumar, S.V.V. & Datta-Roy, A. 2021. A new species of Asian gracile skink (Scincidae: Lygosominae: *Subdoluseps*) from the rain-shadow belts of Nilgiri hills, Western Ghats, India. *Zootaxa* 4950(2):361–376.
- Gmelin, J.F. 1789. *Caroli a Linné, Equitis aurati de stella polari, Archiatri Regii, Med. et Botan. Profess. Upsal. Acad. Paris. Upsal. Holm. Petropol. Beolin. Imper. Londin. Angl. Monsp. Tolos. Florent. Edinb. Bern. Soc. Systema Naturae per Regna Tria Naturae, secundum Classes Ordines, Genera, Species, cum characteribus, differentiis, Synonymis, Locis. Tom 1, Pars III*. Georg. Emanuel. Beer, Lipsiae. Pp. 1033–1516.
- Gray, J.E. 1825. A synopsis of the genera of Reptiles and Amphibia, with a description of some new species. *Annals of Philosophy Series 2* 10:193–217.
- Gray, J.E. 1831. A synopsis of the species of the Class Reptilia. Pp. 1–110 In: Griffith, E. & Pidgeon, E. (eds.) *The Animal Kingdom arranged in conformity with its organization, by the Baron Cuvier, member of the Institute of France, &c. &c. &c. with additional descriptions of all the species hitherto named, and of many not before noticed. Vol. 9. The Class Reptilia arranged by the Baron Cuvier, with specific descriptions*. Whittaker, Treacher, and Co., London.

- Gray, J.E. 1835. Characters of a new genus of Reptiles (*Lialis*) from New South Wales. *Proceedings of the Zoological Society* 2:134–135.
- Gray, J.E. 1839. Catalogue of the Slender-tongued Saurians, with Descriptions of many new Genera and Species [fourth part]. *Annals of Natural History* 2(11):331–337.
- Gray, J.E. 1841. A catalogue of the species of reptiles and amphibia hitherto described as inhabiting Australia, with a description of some new species from Western Australia, and some remarks on their geographical distribution. Pp. 422–449 + 8 pl. in, Grey, G. *Journals of Two Expeditions of Discovery in North-West and Western Australia, During the Years 1837, 38, and 39, Under the Authority of Her Majesty's Government, describing many newly discovered, important, and fertile districts, with observations on the moral and physical condition of the Australian inhabitants, &c. &c.* Vol. II. T. & W. Boone, London. vii + 482 pp.
- Gray, J.E. 1842. Description of some hitherto unrecorded species of Australian Reptiles and Batrachians. Pp. 51–57 In: Gray, J.E. *The Zoological Miscellany*. Treuttel, Wurtz & Co., London. 80 pp.
- Gray, J.E. 1844. Verzeichniss der dünnzungigen Echsen. *Isis von Oken* 1844:columns 584–601.
- Gray, J.E. 1845. *Catalogue of the Specimens of Lizards in the Collection of the British Museum*. Edward Newman, London. xxviii + 289 pp.
- Gray, J.E. 1846. Descriptions of some new species of Indian Lizards. *Annals and Magazine of Natural History Series 1* 18:429–430.
- Gray, J.E. 1867. *The Lizards of Australia and New Zealand in the Collection of the British Museum*. Bernard Quaritch, Piccadilly. 7 pp + 18 pl.
- Günther, A. 1858. Catalogue of Colubrine Snakes in the collection of the British Museum. British Museum, London. xvi + 281 pp.
- Günther, A. 1864. *The Reptiles of British India*. Taylor & Francis, London. xxvii + 452 pp. + XXVI pl.
- Günther, A. 1875. Second report on collections of Indian reptiles obtained by the British Museum. *Proceedings of the Zoological Society* 1875:224–234 + pl. XXX–XXXIV.
- Hardwicke, [T.] & Gray, J.E. 1827. A synopsis of the species of saurian reptiles, collected in India by Major-General Hardwicke. *Zoological Journal* 3(10):213–229.
- Hayden, F.A. 1908. *Historical Record of the 76th "Hindoostan" Regiment: from its formation in 1787 to 30th June, 1881*. Johnson's Head, Lichfield. xiv + 275 pp.
- Holmes & Co. 1851. *The Bengal Obituary; or, a record to perpetuate the memory of departed worth: being a compilation of tablets and monumental inscriptions from various parts of the Bengal and Agra Presidencies. To which is added biographical sketches and memoirs of such as have pre-eminently distinguished themselves in the history of British India, since for formation of the European settlement to the present time*. W. Thacker & Co., London. ix + 426pp.
- Hora, S.L. 1927. Notes on lizards in the Indian Museum. III. On the unnamed collection of lizards of the family Scincidae. *Records of the Indian Museum* 29:1–6.
- James, F.M. 1906. *Annals of the "Five and Nine"; being the history of HM 59th (2nd Nottinghamshire) Regiment of Foot, now the Second Battalion, the East Lancashire Regiment*. S. Shalom & Brothers, Poona. 135 pp.
- Jameson, R. 1863. *Historical Record of the Seventy-Ninth Regiment of Foot or Cameron Highlanders*. William Blackwood & Sons, Edinburgh. xii + 143 pp.
- Johnston, W. 1917. *Roll of Commissioned Officers in the Medical Service of the British Army who served on full pay within the period between the accession of George II and the formation of the Royal Army Medical Corps 20 June 1727 to 23 June 1898 with an introduction showing the historical evolution of the corps*. University Press, Aberdeen. lxxii + 638 pp.
- Lacépède, [B.-G.-É.] 1804. Mémoire sur plusieurs animaux de la Nouvelle-Hollande dont la description n'a pas encore été publiée. *Annales du Muséum National d'Histoire Naturelle, Paris* 4:184–211.
- Laurenti, J.N. 1768. *Specimen medicum, exhibens Synopsin Reptilium emendatam cum experimentis circa venena et antidota reptilium austriacorum*. Joan. Thom. Trattner, Viennae. 214 pp. + 5 pl.
- Leuckart, F.S. 1828. *Breves animalium quorundam maxima ex parte marinarum descriptiones*. Augusti Osswaldi, Heidelberg. 24 pp. + 1 pl.
- Linnaeus, C. 1758. *Systema Naturae per regna tria naturae, secundum Classes, Ordines, Genera, Species, cum characteribus, differentiis, synonymis, locis. Editio Decima, Reformata. Tomus I. Laurentii Salvii, Holmiae*. 823 + [1] pp.
- Linnaeus, C. 1766. *Systema Naturae per regna tria naturae, secundum Classes, Ordines, Genera, Species, cum characteribus, differentiis, synonymis, locis. Editio Duodecima, Reformata. Tomus I. Laurentii Salvii, Holmiae*. 531 pp.
- Martial, Y. 2006. Dr Vaughan rend homage à Wenceslas Bojer. *L'Express*, 12 June 2006.
- Merrem, B. 1820. *Versuch eines Systems der Amphibien/Tentamen Systematis Amphibiorum*. J.C. Kreiger, Marburg, xv + 191 pp. + 1 pl. [duplicating facing pages of German and Latin with identical pagination, up to p. 188].
- Mitchell, N. 1972. *The Indian Hill-station: Kodaikanal*. University of Chicago Department of Geography Research Paper 141. 199 pp.
- Moorsom, W.S. 1860. *Historical Record of the Fifty-Second Regiment (Oxfordshire Light Infantry) from the year 1755 to the year 1858*. 2nd Edition. Richard Bentley, London. xxvii + 455 pp.
- Owadally, A.W. 1976. *A guide to the Royal Botanic Gardens, Pamplemousses*. Botanic Gardens, Mauritius. 77 pp.
- Palot, M.J. 2015. A checklist of reptiles of Kerala, India. *Journal of Threatened Taxa* 7(13):8010–8022.
- Peers, D.M. 1998. Soldiers, surgeons and the campaigns to combat sexually transmitted diseases in colonial India, 1805–1860. *Medical History* 42:137–160.
- Peters, W. 1879. Neue oder weniger bekannte Eidechsenarten aus der Familie der Scinciden (*Eumeces Güntheri*, *Euprepes notabilis*, *Ablepharus rutilus*). *Sitzungsbericht der Gesellschaft Naturforschenden Freunde zu Berlin* 1879(3):35–37.
- Price, F. 1908. *Ootacamund. A History*. Government Press, Madras (reprinted 2000, Asian Educational Services, New Delhi). xiii + 281 pp.
- Roux, J. 1928. Reptiles et amphibiens de l'Inde méridionale. *Revue Suisse de Zoologie* 35(21):439–457.
- Sharma, R.C. 1976. Records of the reptiles of Goa. *Records of the Zoological Survey of India* 71:149–167.
- Sharma, R.C. 1977. A new lizard of the genus *Riopa* Gray (Scincidae) from Tamil Nadu, India. *Records of the Zoological Survey of India* 73(1–4):41–42.
- Sharma, R.C. 2002. *The Fauna of India and Adjacent Countries. Reptilia. Vol. II. (Sauria)*. Zoological Survey of India, Kolkatta. xxv + 430 pp.

- Shea, G.M. 1991. The identity of *Lygosoma* (*Rhodona*) *goerlingi* Ahl, 1935 (Squamata: Scincidae). *Records of the Western Australian Museum* 15(1):303–306.
- Shea, G.M. 2024. *Tortrix australis* Gray, 1841, a senior synonym of *Demansia reticulata* (Gray, 1842) (Elapidae). *Records of the Western Australian Museum* 39:1–8
- Slack, J. 1884. *The history of the late 63rd (West Suffolk) Regiment*. Army & Navy Co-Operative Society, London. xvi + 263 pp.
- Smith, M.A. 1935. *The fauna of British India, including Ceylon and Burma. Reptiles and Amphibia, Vol. II. Sauria*. Taylor and Francis, London. 440 pp. + 1 map + pl I.
- Smythies, R.H.G. 1894. *Historical Records of the 40th (2nd Somersetshire) Regiment, now 1st Battalion The Prince of Wales's Volunteers (South Lancashire Regiment.) from its formation in 1717, to 1893*. A.H. Swiss, Devonport. xvi + 620 pp.
- Steindachner, F. 1870. Herpetologische Notizen (II). Über einige neue oder seltene Reptilien des Wiener Museums. *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften in Wien* 62:326–349, 8 plates.
- Stoliczka, F. 1871. Notes on new or little-known Indian lizards. *Proceedings of the Asiatic Society of Bengal* 1871:192–195.
- Stoliczka, F. 1872. Notes on various new or little known Indian lizards. *Journal of the Asiatic Society of Bengal* 41(2):86–135 + pl. II–V.
- Suresh, S., Rajesh, S. & Pradeepkumar, A.P. 2018. History and development of Devikulam High Range, Idukki District, Kerala. Heritage: *Journal of Multidisciplinary Studies in Archeology* 6:697–711.
- Sutherland, D. 1972. *Tried and Valiant: The story of the Border Regiment 1702–1959*. Leo Cooper, London. 239 pp.
- Swiney, G.O. 1893. *Historical Records of the 32nd (Cornwall) Light Infantry, now the 1st Battalion Duke of Cornwall's L.I., from the formation of the regiment in 1702 down to 1892*. Simpkin, Marshall, Hamilton, Kent, and Co., London. xiii + 386 pp.
- Thunberg, C.P. 1787. Beskrifning på några sällsynte och okände Ödlor. *Kongl. Vetenskaps Academiens Nya Handlingar* Series 2 8(April, Majus, Junius):123–128.
- Trimble, W.C. 1876. *The Historical Record of the 27th Inniskilling Regiment, from the period of its institution as a volunteer corps till the present time; with an appendix, roll of colonels, roll of present officers, etc., etc.* William Clowes & Sons, London. xviii + 160 pp.
- Venugopal, P.D. 2010. An updated and annotated list of Indian lizards (Reptilia: Sauria) based on a review of distribution records and checklists of Indian reptiles. *Journal of Threatened Taxa* 2(3):725–738.
- Wallace, N.W. 1879. *A Regimental Chronicle and List of Officers of the 60th, or the King's Royal Rifle Corps, formerly the 62nd, or the Royal American Regiment of Foot*. Harrison, London. viii + 314 pp.
- Whitting, J.E. 1878. *Annals of the Thirty-Seventh North Hampshire Regiment*. Warren & Son, Winchester. [v] + 54 pp.
- Wylly, H.C. 1926. *History of the King's Own Yorkshire Light Infantry. Vol I*. Percy Lund, Humphries & Co., London. viii + 374 pp.

We suggest the following format for citing this article:

Shea, G. M. 2025. The Mysterious Doctor Rurk and His Eponymous Catskink, *Ristella rurkii* Gray 1839 (Squamata: Scincidae: Lygosominae: Ristellini) with Notes on Other Collectors for the Museum of the Army Medical Service at Chatham. *Bibliotheca Herpetologica* 19(3):12–27.



Herpetological Contributions of Charles Conrad Abbott, Eccentric 19th Century Archeologist and Naturalist

C. Kenneth Dodd, Jr.

5222 N.W. 56th Court, Gainesville, Florida 32653, USA, terrapene600@gmail.com

Charles Conrad Abbott (4 June 1843 – 27 July 1919; Fig. 1) was a controversial figure in the emerging science of archeology in the late 19th Century. His family was among the most prominent in the Trenton, New Jersey, area. Abbott's father, Timothy, was a successful merchant and his mother Susan was the daughter of Solomon White Conrad, a professor of Botany at the University of Pennsylvania. Abbott attended the prestigious Trenton Academy and later the University of Pennsylvania, where he received his M.D. degree in 1865. Before graduation, he served a brief stint in the Union Army during the American Civil War, although he never saw action. According to his biography (Dillian and Bello, 2020), Abbott was “a terrible doctor” whose “abrasive personality and an overall indifference towards medicine contributed to a poor bedside manner.” Not surprisingly, he was unsuccessful as a physician.

In 1867, Abbott married Julia Boggs Olden of Princeton, New Jersey. Her family was well-off financially, having settled in the Trenton area in the late 1600s, where they accumulated extensive land holdings. The area was still largely held in agriculture by the mid-19th century when the Abbotts moved to Three Beeches in 1874, a farm bought for him and his wife by Julia's father. Charles Abbott remained on the farm until the family home burned down in 1914. In 1919, he died of Bright's disease, a kidney infection, at age 76.

Abbott never proved adept at managing the farm. Dillian and Bello (2020; p. 27) stated that “he preferred to sleep late, nap often, and follow his archeological and naturalist pursuits.” Abbott is further quoted as saying “there is danger in the unsunned air of early morning, and insanity is the result of too frequent lungfuls of the day at dawn; that farmers lose their sanity because of early rising, and, if not quite so bad as this, at least their mental strength is prematurely weakened.” Dillian and Bello (2020) dryly noted that “Charles appeared to be in little danger of succumbing.” Job Olden, Julia's father, expressly stated in his will that no part of the farm or any of his possessions or finances should ever go to Charles Abbott. Job was not an approving father-in-law.

ARCHEOLOGIST

The location of Three Beeches proved advantageous to both the amateur naturalist and archeologist. Situated in a rich

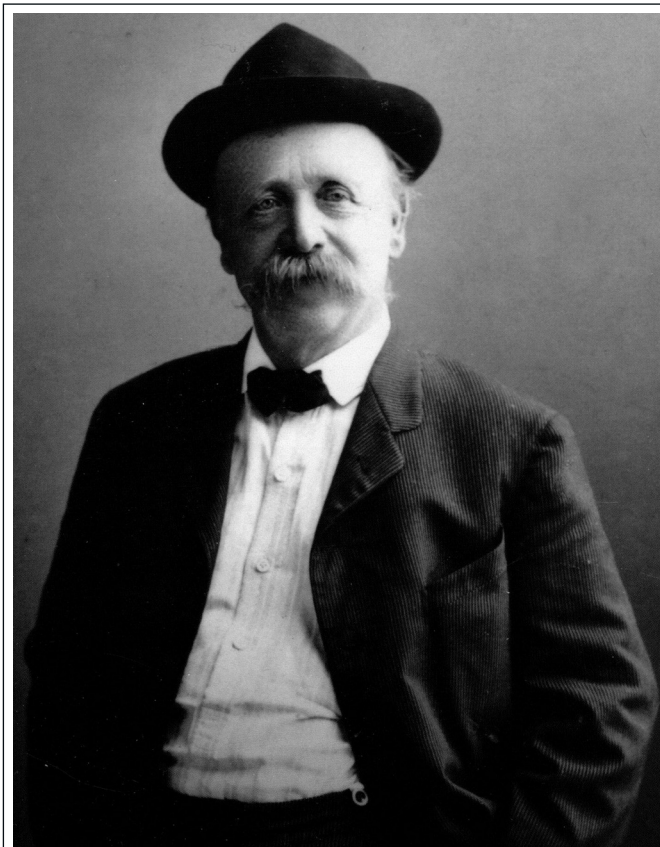


Fig. 1. Charles Conrad Abbott. Undated. Charles Conrad Abbott Papers (C0290), Box 15, Folder 2; Manuscripts Division, Department of Rare Books and Special Collections, Princeton University Library.

agricultural area on a bluff overlooking the Delaware River and in proximity to several creeks, the farm included fields, riparian forest, and marshes rich in wildlife. Although much of the land was unsuited for farming because of man-made changes to local drainage patterns, its location proved ideal for the naturalist ramblings favored by Charles Abbott. By all accounts, Abbott was much more at home wandering around the river margins, forests, and fields near his home than he ever was in medicine, managing a farm, or anything else that required concentrated effort and work. Instead, he collected Native American artifacts, particularly from the exposed gravel terraces along the river, and took extensive

daily notes on nature in the region of his and adjacent farms near Trenton.

The Delaware Valley was rich in indigenous artifacts, which Abbott eagerly collected as surface finds and sent to the Peabody Museum at Harvard University (e.g., more than 800 specimens of stone tools in 1872 alone). Abbott believed the tools he collected from the gravels along the river bluffs were of paleolithic (Pleistocene) age rather than more recent age and thus suggested human occupation of North America much earlier than previously believed. He gained extensive notoriety for these claims and published papers in respected journals detailing his finds and interpretations (e.g., Abbott, 1872, 1876, 1883), apparently using his medical degree and family connections as a measure of authority (as discussed by Dillian and Bello, 2020). Publication brought attention to his finds and his ideas to the public and amateur archeologists, as well as an increasing number of academically oriented museum and university-based scientists. Widely acclaimed initially, support for his hypothesis of colonization by paleolithic peoples diminished in the 1890s as sites were more carefully excavated.¹ Even as evidence accumulated that his hypothesis was not supported by field data (e.g., Holmes, 1892a, 1892b; extensive discussion and bibliography in Dillian and Bello, 2020), Abbott persisted in refusing to recognize that he might be incorrect. Disagreements turned into intense personal attacks, jealousy, and ultimately banishment by the professional archeological community (Dillian and Bello, 2020).

Abbott had no professional training either as an archeologist or naturalist, which at first did not diminish his influence on archeology, as very few individuals interested in archeology were in academic posts at the time². He was appointed as an unsalaried field assistant to Harvard's Peabody Museum in 1876 because of his long history of communications with university personnel (particularly Frederic Ward Putnam) and the vast numbers of specimens he provided to the nascent museum. Although not an official employee, the appointment provided an affiliation and title. From 1876 to 1889, Abbott continued to eke out a living as a farmer and writer. However, with his Peabody Museum affiliation, he contributed large numbers of artifacts, numbering more than 25,000, and published on his paleolithic ideas which helped establish the Peabody Museum as a leader in archeological collections.

In 1889, Abbott was offered a professional salaried position, Curator of the American Archeological Museum, to develop the archeological museum being planned at the University of Pennsylvania. He retained this position until late 1893 when intense personality clashes with museum administrators and his poor work habits resulted in his termination. Abbott was by all accounts, including his own, at times an extremely disagreeable and confrontational individual, fully capable of venting anger and insults toward colleagues and administrators.³ In 1900, Abbott was approached by Princeton University and asked to donate his personal papers to the library there. He agreed but then became aware of attempts to

establish an archeological museum at Princeton along the lines of the Peabody Museum at Harvard. For the next 12 years, he worked to establish such a museum and donated another 1,300 specimens from the area around his home in Trenton. The museum never materialized, however, in part because of Abbott's abrasive personality and his inattentive work habits.

It is now hypothesized that humans entered North America by ca. 20,000 years ago, but no evidence of their presence in the Delaware Valley currently is known at this time. Abbott's finds, important as they were, are now thought to date from the Archaic (ca. 8,000 to 1,000 BC) to the period of early colonial settlement. His collections are now deposited in museums throughout the eastern United States. Although he is often dismissed largely because of his personality, his slipshod field techniques, and his inability to evolve his thinking and accept different interpretations as new data became available, he remains one of the pioneers of archeology in the eastern United States (Dillian and Bello, 2020). The Abbott farm at Three Beeches has been designated as the Abbott Farm National Historic Landmark as a tribute to the important archeological work conducted there by Abbott and later scientists. See <https://abbottmarshlands.org/wp-content/uploads/2024/10/AbbottFarmInterpretivePlan-compressed2.pdf>.

NATURALIST

Charles Abbott was interested in natural history from an early age. As noted by Dillian and Bello (2020), his first papers on fishes were in the early 1860s when he was still a teenager. Even before he became well-known as an archeologist, he had published numerous papers and natural history observations on fishes and birds. Despite his archeological interests, his natural history observations continued throughout his career, published as short notes on mammals, birds, amphibians and reptiles, and crayfish. Throughout his life, Abbott kept a daily diary of his observations on nature, his discoveries while "rambling," the weather, personal interactions with colleagues and neighbors (many of which were critical and openly hostile), and farming. The diary notes formed a rich source for his later nature writings.

In order to supplement his meager income from farming, Abbott wrote books based on his natural history observations, and these became his major source of income in his later years. His first popular book was *Naturalist's Rambles About Home* (1884e; Figs. 2, 3) with others such as *Upland and Meadow* (1886), *Waste-land Wanderings* (1887), *Outings at Odd Times* (1890), and *Notes of the Night, and Other Outdoor Sketches* (1896). His book *The Birds About Us* (1894) was a critical and financial success, with good reviews even from the professional ornithological community. He also published a few novels, for example, *A Colonial Wooing* (1895). Dillian and Bello (2020) provide a more comprehensive list, with 18 book titles listed. These books were popular and well-received in his era but are little-known today. An admirer of Henry David Thoreau, Dillian and Bello (2020) suggest

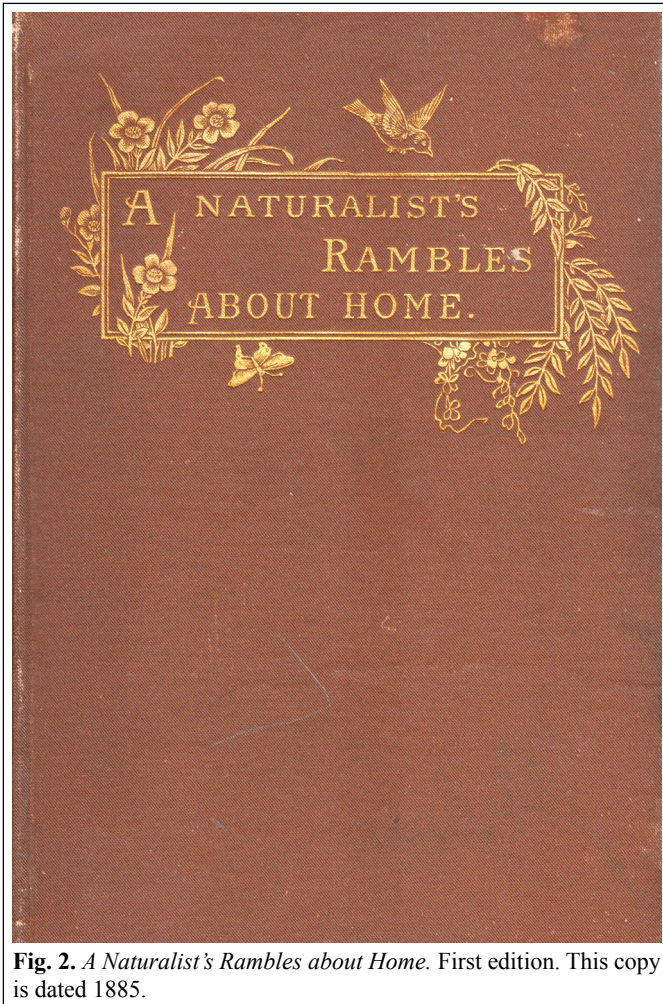


Fig. 2. *A Naturalist's Rambles about Home*. First edition. This copy is dated 1885.

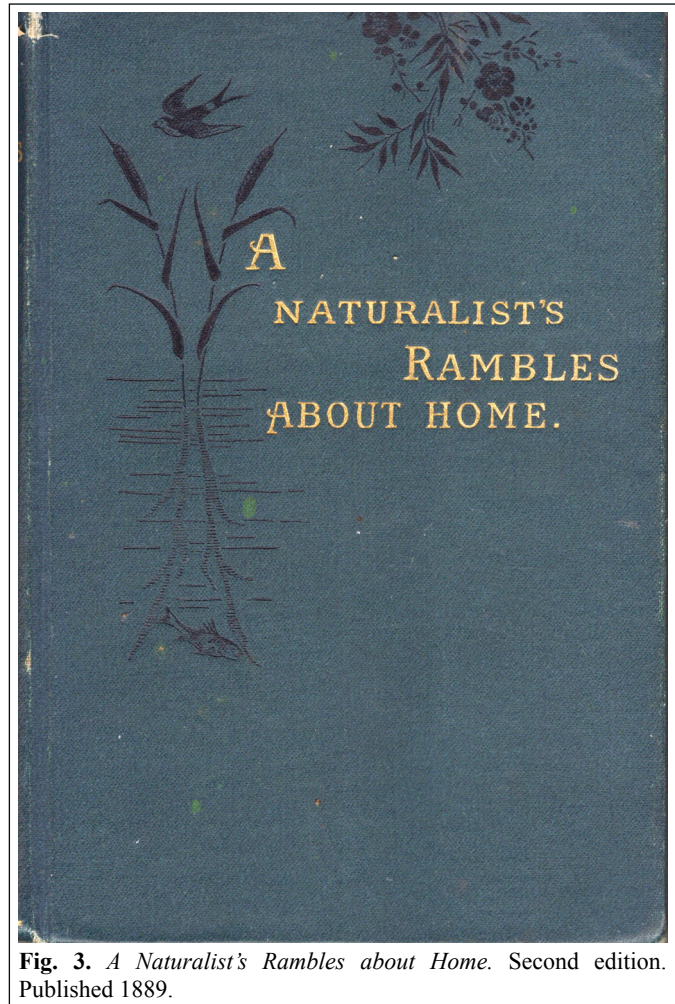


Fig. 3. *A Naturalist's Rambles about Home*. Second edition. Published 1889.

that Abbott's writings on natural history had considerable influence on 20th Century naturalists, particularly Aldo Leopold.

ABBOTT'S HERPETOLOGY

Charles Abbott was a naturalist whose main interest was birds, since they were obviously the most likely vertebrates observed during his rambles about his farm and region. However, he published short notes and papers on *Acris crepitans*, *Dryophytes* (= *Hyla*) *andersonii*, *Scaphiopus holbrookii*, and *Sceloporus undulatus*, as well as on hibernation (corrects misconceptions about activity during overwintering) and why thousands of tiny spadefoots are sometimes observed after rainfall (no, they did not fall from the sky!) (see references below). None of his natural history books included anything but passing notes on amphibians and reptiles (i.e., casual sightings, frogs calling) except for *A Naturalist's Rambles About Home*. However, Charles Abbott made notable 19th Century contributions to herpetology based on three major publications.

***Catalogue of the Vertebrate Animals of New Jersey* (1868).** This compilation was the first listing of the vertebrates

from the eastern U.S. state of New Jersey. Abbott wrote all sections, mammals, birds, amphibians and reptiles (both included under the heading "Reptiles"), and fishes. How geologist George Cook came to assign Abbott this task is not stated, nor is it stated how the list was compiled. Presumably most information originated from Abbott's fieldwork and from local naturalists, but there are no acknowledgements. Several accounts mention Abbott's first-person field observations. Fowler (1906) stated that Edward D. Cope largely made the identifications, and Dillian and Bello (2020) noted that Abbott was a frequent correspondent with Cope.

Beginning with turtles, a short narrative is provided for each species under its scientific and common name, followed by notes on abundance, distribution, habitat, and economic value, although not all topics were included with each very short account. Abbott records 12 turtles (no sea turtles), 2 lizards, 16 snakes, 15 salamanders, and 13 frogs. Some species mentioned are clearly synonymous (e.g., *Plethodon erythronotus* and *P. cinereus* are not separate species, as neither are *Notophthalmus viridescens* and *N. miniatus*), but the remainder can be assigned to currently recognized species. In 1859, Abbott reported capturing a *Clonophis kirtlandii*, a Midwestern prairie species that is not known to occur in

New Jersey, but the location was not reported. Fowler (1906) included an account of this species based on Abbott's (1868) checklist and Wright and Wright (1957) mentioned the New Jersey record, but Trapido (1937) did not because no further individuals had been reported since Abbott's observations.

There are a number of typographical errors in the scientific and common names, i.e., *dipedon* for *sipedon*, *dirtalis* for *sirtalis*, *platyrrhinus* for *platyrhinus*, and Blake Snake for Black Snake. Further confusion involves species (e.g., *Rana pipiens* is called a bull-frog but the account narrative clearly refers to *R. catesbeiana*). Fowler (1906) attributed this to an "unfortunate uncorrected proof." Given Abbott's inattention to detail, it may not be surprising that the information in the accounts is sometimes not accurate. For example, *Apalone spinifera* was described as a "salt-water turtle" (it is entirely freshwater); *Graptemys geographica* was said to occur throughout the state (it occurs in the Delaware River along the western margin of the state and has been observed basking along the Delaware & Raritan Canal; *Graptemys geographica* is currently known from six counties in west-central New Jersey (Schwartz and Golden, 2002; Zappalorti, personal observation); and *Lampropeltis triangulum* and other species were said to have a fondness for milk (a folktale). Some of the abundance comments are intriguing. For example, *Clemmys guttata* and *Glyptemys mühlenbergii* were reported as very abundant. Likewise he claimed that *Crotalus horridus* had not been reported north of Trenton in 50 years (implying that it formerly occurred in the Trenton region; currently there are two disjunct populations of *Crotalus horridus* in New Jersey, one in the north and one in the south separated by 128.75 km). It seems obvious that this section did not receive rigorous editorial or content review. Inattention to detail makes this early checklist of somewhat limited value, but it is among the earliest attempts to document any state's herpetofauna.

In 1890, Julius Nelson (6 March 1858 – 15 February 1916), a professor at Rutgers University, updated Abbott's vertebrate catalogue of 1868. Spelling errors were corrected, the taxonomy was made current, and species recorded since 1868 were added. Nelson added short descriptions of each species, but otherwise did not alter Abbott's text. Instead, Abbott's original text and comments were included verbatim and placed in parentheses after the descriptions. There is no record of Abbott's involvement with the 1890 revision. Nelson had joined Rutgers shortly after receiving his PhD in 1888 and did not include any original observations on the herpetofauna.

A Naturalist's Rambles about Home (1884e).⁴ *Rambles* was certainly Charles Abbott's most extensive contribution herpetologically. The amphibian and reptile section covers 100 pages of narrative detailing Abbott's "short studies" based on his natural history field observations mostly in the Trenton area. These are presented in the first person without much reference to scientific literature or the use of scientific names. Abbott relies on his powers of observations, contradicts

incorrect information often seen in popular accounts and newspapers, tells stories, and speculates as to what the animal experiences in its habitat. Sometimes he presents keen insights, such as wondering whether the leaf litter tail-rattling of common non-venomous snakes when confronted by danger could be behavioral mimicry with the venomous rattlesnake. The text, while presented in narrative popular prose, exemplifies Abbott's ability to enthrall his readers with natural history, something his personality seemed to prevent him from doing in person. Even today, the accounts make interesting reading. *Rambles* is frequently cited by later authorities, particularly Fowler (1906). A "second edition" of *Rambles* was published in 1889 and reprinted in 1892, but it appears identical to the first edition.

Young Folk's Cyclopedia of Natural History and Cyclopedia of Natural History (1887–1895; Figs. 4, 5). Despite the different titles, publishers, and dates of publication (see below), the *Cyclopedia* is essentially the same book. The book consists of 32 chapters, of which six cover amphibians and reptiles: XXV (Ophidia, or Serpents; pp. 481–502), XXVI (Lacertilia, or Lizards; pp. 503–513), XXVII (Crocodilia, or Alligators; pp. 514–519), XXVIII (Chelonia, or Turtles; pp. 520–529), XXIX (Caecilians and Salamanders; pp. 530–541), and XXX (Toads and Frogs; pp. 542–560). The coverage is worldwide, but non-North American species are limited to only the best-known species, e.g., geckos, chameleons, pythons and boas, the Australian Moloch, European Olm, and Surinam Toad (*Pipa*). Most of the black and white illustrations are of North American species familiar to Abbott. The text is geared to introduce young readers and others interested in natural history to a diversity of species and, perhaps as expected, it is oriented more to mammals (pp. 9–209) and birds (pp. 210–480) than to "lower" vertebrates.

One curious edition of the *Cyclopedia* was published as *The Model Book of Natural History* by the Farm and Fireside Library of Springfield, Ohio (Figs. 6, 7). The Farm and Fireside Library produced cheap copies of popular books to be sold to rural farm residents to stimulate reading and expand knowledge beyond rural, often isolated, communities. The books were published in paperback format using rather poor paper to keep costs low. Single copies sold for US \$0.50, but Abbott's *Cyclopedia* sold for US \$1.00 since it was a double issue. The text is exactly the same as in the hard-back editions sold by the original publishers. The library operated from 1881 to 1901.⁵ I have been unable to determine if other natural history books by Abbott or other titles of herpetological interest were included in this series.

CONCLUSION

Charles Conrad Abbott was not a major influence on herpetology in the late 19th Century, but he was certainly well-known among the naturalists and scientists of his day. Although he was primarily professionally interested

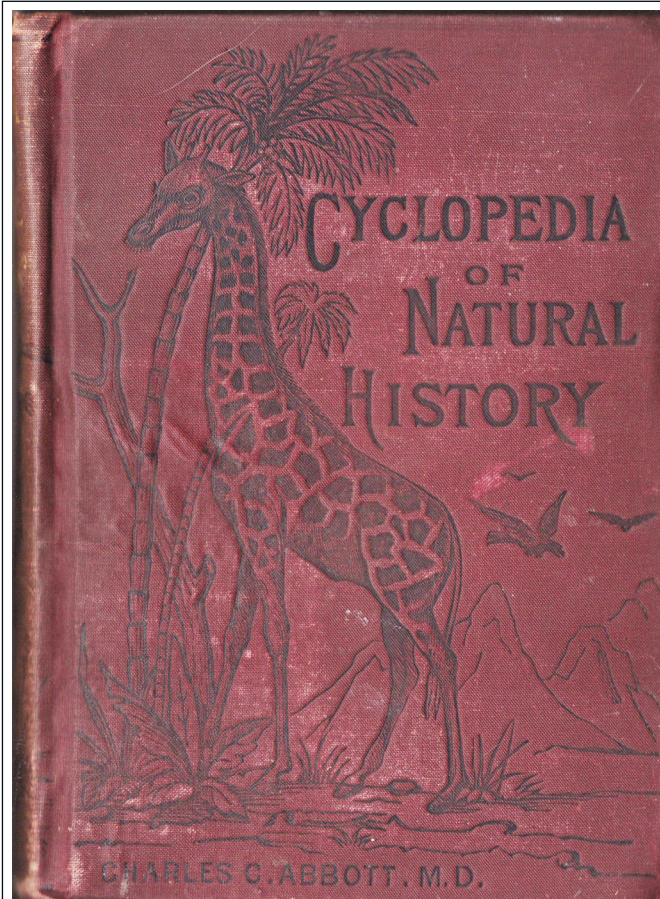


Fig. 4. *Cyclopedia of Natural History*. 1888 edition.

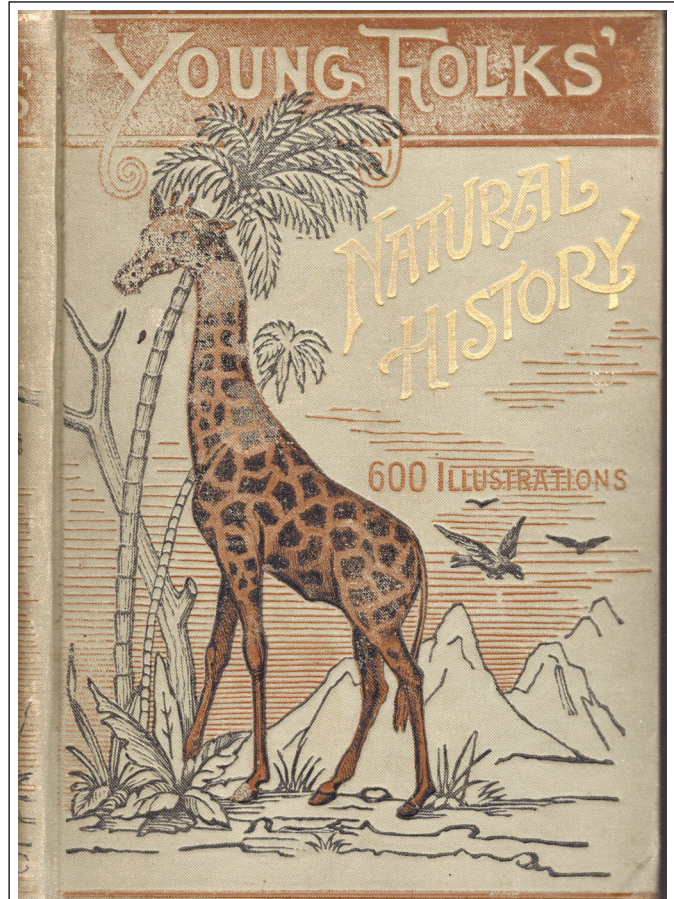


Fig. 5. *Young Folks' Cyclopedia of Natural History*. 1895 edition.

in archeology, he communicated extensively with the naturalists of his era, including Frederic Ward Putnam, Edward D. Cope, and Henry W. Fowler. He was the first to attempt documentation of the vertebrates of New Jersey, and his natural history observations based on his own direct field notes were of interest and widely referred to by later authors. No doubt, his natural history books stimulated much interest in the subject, and his reliance on direct observation by-passed the many “nature-faker” writers of his day (see Chapter 7—Abbott the Naturalist—in Dillian and Bello, 2020, for an examination of his legacy in natural history). Charles Conrad Abbott was viewed by colleagues as cantankerous, difficult-to-be-around, somewhat sloppy in technical fieldwork, lazy, and stubborn, but he was definitely a curious character and an influential writer and naturalist following his own path in life.

HERPETOLOGY BIBLIOGRAPHY OF CHARLES CONRAD ABBOTT

- Abbott, Charles Conrad. 1868. *Catalogue of the Vertebrate Animals of New Jersey*. Appendix E, p. 751–880 In: G.H. Cook, *Geology of New Jersey*, New Jersey Geological Survey, Newark, New Jersey. [amphibians and reptiles on p. 799–805].
- Abbott, Charles Conrad. 1882. Notes on the habits of the “savannah cricket frog.” *American Naturalist* 16: 707–711.

- Abbott, Charles Conrad. 1884a. Recent studies of the spadefoot toad. *American Naturalist* 18:1075–1080.
- Abbott, Charles Conrad. 1884b. The intelligence of batrachians. *Science* 3: 66–67.
- Abbott, Charles Conrad. 1884c. Hibernation in the lower vertebrates. *Science* 4(75): 34–39. [Reprinted in 1887 in *The Swiss Cross* 2(6): 172–174.]
- Abbott, Charles Conrad. 1884d. The intelligence of snakes. *Science* 3: 253–256.
- Abbott, Charles Conrad. 1884e. *A Naturalist's Rambles about Home*. D. Appleton, New York. 485 p. [amphibians and reptiles on p. 250–350]
- Abbott, Charles Conrad. 1887. *Young Folk's Cyclopedia of Natural History*. Hurst and Co., New York. 620 p. [amphibians and reptiles on p. 250–350]
- Abbott, Charles Conrad. 1888a. *Cyclopedia of Natural History*. Nims and Knight, Troy, New York. 620 pp. [amphibians and reptiles on p. 481–560]
- Abbott, Charles Conrad. 1888b. *The Model Book of Natural History*. Mast, Crowell & Kirkpatrick, Springfield, Ohio. 620 p. [exact copy of the *Cyclopedia of Natural History*]
- Abbott, Charles Conrad. 1889a. *A Naturalist's Rambles about Home*. Second edition, revised. D. Appleton, New York. Reprinted 1892. [amphibians and reptiles on p. 250–350]
- Abbott, Charles Conrad. 1889b. The pine-tree lizard. *Popular Science Monthly* 34: 162–171.
- Abbott, Charles Conrad. 1890. Voice of *Hyla andersonii*. *American Naturalist* 24: 189.

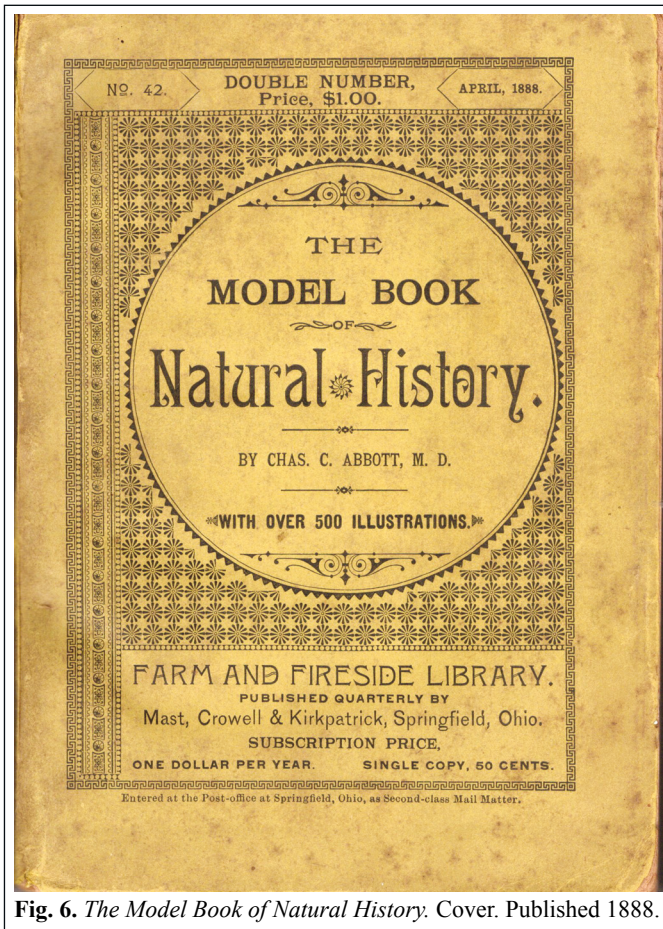


Fig. 6. *The Model Book of Natural History*. Cover. Published 1888.

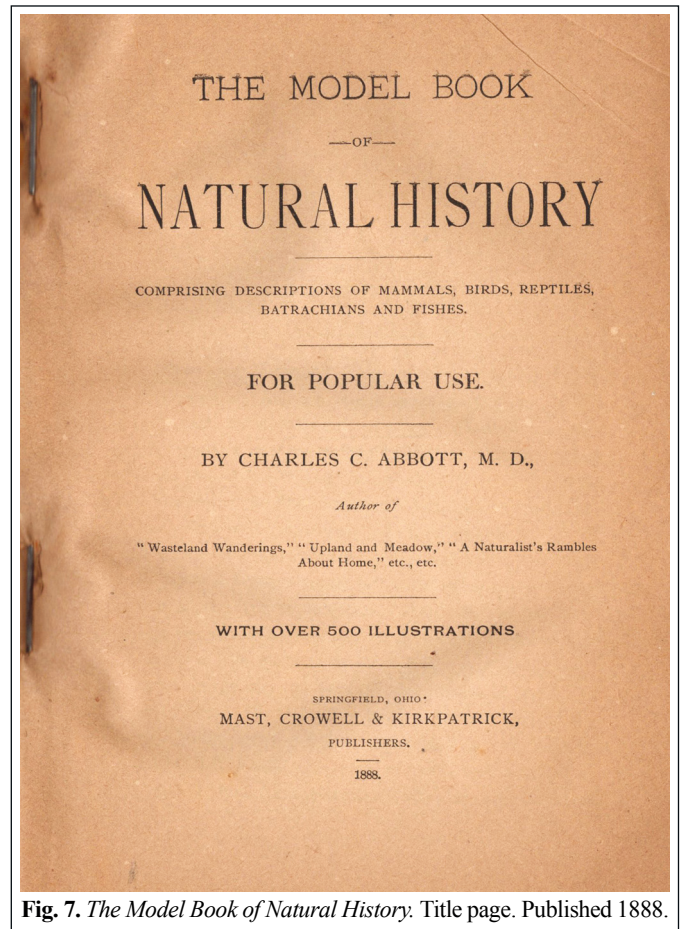


Fig. 7. *The Model Book of Natural History*. Title page. Published 1888.

Abbott, Charles Conrad. 1895. *Young Folks' Cyclopedia of Natural History*. A.L. Burt, New York. 620 pp. [amphibians and reptiles on p. 250–350]

Abbott, Charles Conrad. 1904. One explanation of reported showers of toads. *Proceedings of the American Philosophical Society* 43: 163–164.

NOTES

1. Abbott never attempted to accurately describe the location of his finds or put them in a stratigraphic context. He was frequently admonished by Frederic Ward Putnam of the need to do so and to follow generally accepted careful archeological methodology, but he stubbornly refused to do so.
2. When Abbott began his collections and presented his ideas on supposed paleolithic finds in New Jersey, archeology was pursued by amateurs without specialized training. The first PhD in archeology was awarded in 1894, and only afterwards were academic credentials generally required for museum or university positions in this field.
3. Examples of Abbott's often vitriolic attacks are in Dillian and Bello (2020). His biographers described him as "polarizing, irascible, petulant, and brash" but also as "a prolific writer, colorful character, and innovative thinker" (p. 246).
4. Published 1884 but also reprinted with an 1885 date. The copyright of the 1885 reprint and the second edition is shown as 1884.

5. The Edward T. LeBlanc Memorial Dime Novel Bibliography lists up to 199 numbers issued within this series, although not all numbers are accounted for. The *Model Book of Natural History* was No. 42, which is not listed among the titles in this bibliography. See: <https://dimenovels.org/Series/297/Show>. Accessed 17 January 2025.

6. The biography was reviewed by Bernard K. Means. 2021. New Jersey Studies, p. 396–403. Further commentary on Abbott's contributions to archeology are in a blog post by Curtis Runnels, Professor of Archeology, Princeton University, 2 January 2022. <https://blogs.bu.edu/runnels/2022/01/02/dr-charles-conrad-abbott-and-the-curious-case-of-the-american-paleolithic/>. Accessed 18 January 2025.

ACKNOWLEDGEMENTS

I thank Bob Zappalorti for providing updated information on the distribution of several New Jersey species, and Breck Bartholomew for his editorial attention to citations.

REFERENCES

- Abbott, Charles Conrad. 1872. The Stone Age in New Jersey. *The American Naturalist* 6(3): 144–160.
- Abbott, Charles Conrad. 1876. Indications of the antiquity of the Indians of North America, derived from a study of their relics. *The American Naturalist* 10(2): 65–72.

- Abbott, Charles Conrad. 1883. An historical sketch of the discoveries of Paleolithic implements in the Valley of the Delaware River. *Proceedings of the Boston Society of Natural History* 21: 124–132.
- Abbott, Charles Conrad. 1886. *Upland and Meadow. A Poet-quissings Chronicle*. Harper and Brothers, New York. x + 397 p.
- Abbott, Charles Conrad. 1887. *Waste-land Wanderings*. Harper and Brothers, New York. xi + 312 p.
- Abbott, Charles Conrad. 1890. *Outings at Odd Times*. D. Appleton, New York. 282 p.
- Abbott, Charles Conrad. 1894. *The Birds About Us*. J.B. Lippincott Co., Philadelphia, Pennsylvania. 288 p.
- Abbott, Charles Conrad. 1895. *A Colonial Wooing*. J. Lippincott Co., Philadelphia, Pennsylvania. 241 p.
- Abbott, Charles Conrad. 1896. *Notes of the Night, and Other Outdoor Sketches*. The Century Company, New York. 231 p.
- Dillian, Carolyn D. and Charles A. Bello. 2020. *Misadventure in Archeology. The Life and Career of Charles Conrad Abbott*. University of Pennsylvania Museum of Archeology and Anthropology, Philadelphia, Pennsylvania. ix + 275 p.⁶
- Fowler, Henry W. 1906. The Amphibians and Reptiles of New Jersey. In: *Annual Report of the State of New Jersey*. MacCrellish & Quigley, Trenton, New Jersey. p. 29–250.
- Holmes, William H. 1892a. Modern quarry refuse and the Paleolithic theory. *Science* 20(512):295–297.
- Holmes, William H. 1892b. Aboriginal quarries of flakeable stone and their bearing upon the question of Paleolithic man. *Proceedings of the American Association for the Advancement of Science* 41: 279–280.
- Nelson, Julius. 1890. *Descriptive Catalogue of the Vertebrates of New Jersey (A Revision of Dr. Abbott's Catalogue of 1868)*. Final Report of the State Geologist. Vol. II. Geological Survey of New Jersey, John L. Murphy, Trenton, New Jersey. [reptiles and amphibians on p. 637–657]
- Schwartz, Vicki and David M. Golden. 2002. *Field Guide to Reptiles and Amphibians of New Jersey*. New Jersey Division of Fish and Wildlife, Trenton, New Jersey. 89 p.
- Trapido, Harry 1937. *A Guide to the Snakes of New Jersey*. The Newark Museum, Newark, New Jersey. 60 p.
- Wright, Albert H. and Anna A. Wright. 1957. *Handbook of Snakes of the United States and Canada*. Volume I. Comstock Publishing Associates, Ithaca, New York. xviii + 564 p.

We suggest the following format for citing this article:

Dodd, C. K. Jr. 2025. Herpetological Contributions of Charles Conrad Abbott, Eccentric 19th Century Archeologist and Naturalist. *Bibliotheca Herpetologica* 19(4):28–34.



John Hutchison Garnier (1823–1898) and his Contributions to the Herpetology of Ontario

Aaron M. Bauer

Department of Biology and Center for Biodiversity and Ecosystem Stewardship,
Villanova University, 800 Lancaster Avenue, Villanova, Pennsylvania 19085, USA
aaron.bauer@villanova.edu

Abstract: John Hutchison Garnier (1823–1898) was a pioneering herpetologist based in the town of Lucknow, Ontario. Some mystery surrounds his birthplace as well as his birthname. Garnier was a physician but spent much of his time hunting and observing wildlife. He built a large private natural history collection by exchanging specimens with correspondents all over the world. Among his papers on amphibians and reptiles was the first list of the herpetofauna of Ontario published in 1881 and augmented in 1882 and 1894. Although his species list was inflated with misidentifications and synonyms, he appears to have recognized 39 of the 50 species of amphibians and reptiles currently accepted as present in the province or recently extirpated. Garnier's publications included several novel nomina. He described two species of *Necturus* from Ontario. While one is generally acknowledged and included in the synonymy of *N. maculosus*, the other has only been cited once in 144 years. Additional new varieties named by Garnier have likewise escaped notice. He also published on the two rattlesnake species in Ontario, including the now extirpated *Crotalus horridus*, and on treatments for snakebite. Most of Garnier's work is now forgotten and only 50 Ontario specimens are confirmed as extant from his collection, now housed in the Royal Ontario Museum and the U.S. National Museum of Natural History. His activities as a frontier naturalist in the mid-19th century represent a starting point for herpetological studies in Ontario.

Keywords: Canada; *Necturus*; *Crotalus*; *Thamnophis*; biography; Royal Ontario Museum; collections

INTRODUCTION

Herpetofaunal studies in Canada began quite late in comparison to those in the adjacent United States (Cook 2007; Rowell 2012). This is even true of Ontario, Canada's most populous province and home to both its largest city, Toronto, and its capital, Ottawa. Most sources cite Nash (1905, 1908) as the first summary of the amphibians and reptiles of Ontario, and Bleakney (1958) noted that for eastern Ontario, Patch's (1918) work on the Ottawa area was the earliest available publication. However, there were earlier attempts to document the provincial herpetofauna. Ure (1858) listed 14 chelonians, 13 snakes, 12 anurans and 12 urodeles in *The Hand-Book of Toronto* (Fig. 1). This impressive tally (the current species and subspecies count for greater Toronto is only about 30; ORAA 2023), however, includes many obviously extralimital forms, including, for example, *Amphiuma tridactylus* (sic, *A. tridactylum*) and *Sphargis coriacea* (= *Dermochelys coriacea*). It is based mostly on earlier American literature, most notably that of DeKay (1842) and, thus, includes numerous taxa absent from Ontario. Other early works from the area, based on actual observations, include that of Small and Lett (1884), which summarized the work of ornithologist William L. Scott and entomologist and botanist William H. Harrington (1852–1918), one of the founding members and an early president of the Ottawa Field Naturalists' Club (Brunton 2004), and recorded information on 12

species in the province. In another early publication, Latchford (1887) documented the salamanders occurring near Ottawa. Other works at least mentioning some local amphibians and reptiles have been summarized by Rowell (2012).

I here wish to draw attention to another early publication which has the distinction of having provided what appears to be the first purported comprehensive list of Ontario amphibians and reptiles. "List of Reptilia of Ontario" was published in *The Canadian Sportsman and Naturalist*, Vol. 1, No. 5 (Fig. 2), published on 14 May 1881 by John Garnier, M.D. of Lucknow, Bruce County, Ontario. The list is of interest not only for its early appearance but for its inclusion of a very large number of species (greater than the Ontario fauna recognized today) and because it includes the description of a new species of salamander, a junior synonym of *Necturus maculosus*, that appears to have been cited only once in the intervening 144 years. Further, Garnier himself was one of the most interesting personages in the history of Canadian herpetology and I take this opportunity to preface my discussion of his list of Ontario amphibians and reptiles with a summary of his life and his herpetological contributions.

JOHN HUTCHISON GARNIER

Garnier's life story has been recounted several times (e.g., Anonymous 1898a, 1898b, Mackenzie 1927; Johnston 1933a, 1933b; Caswell 1936; Dymond 1940) and he has also been

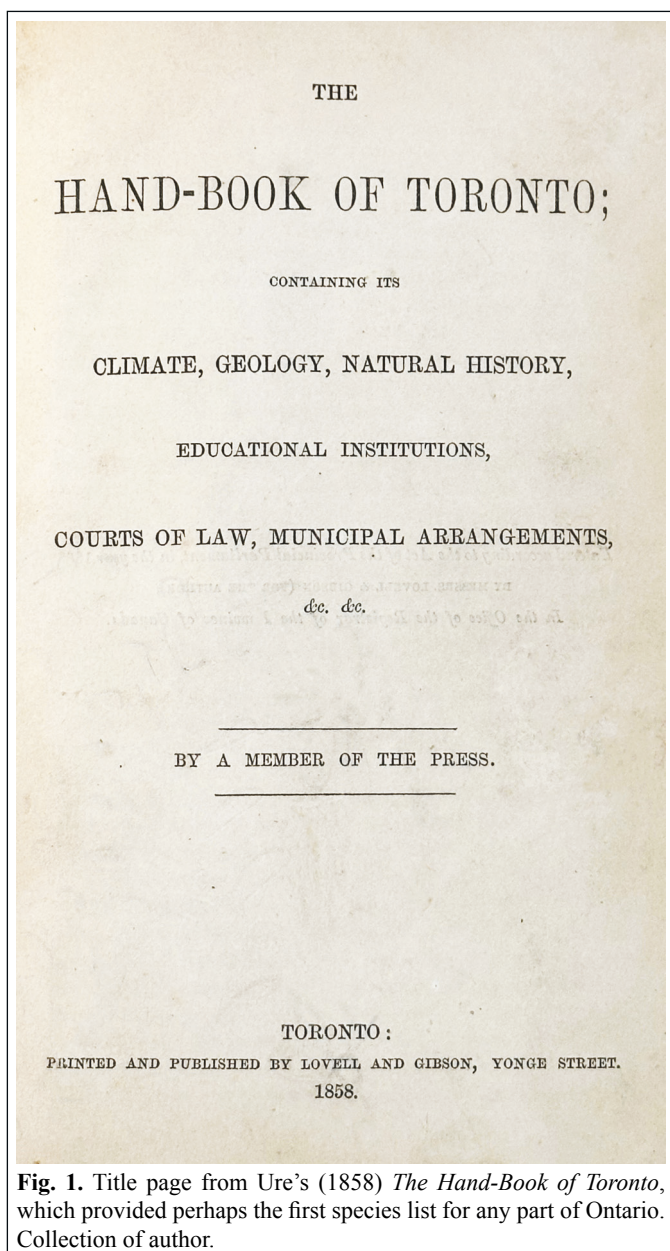


Fig. 1. Title page from Ure's (1858) *The Hand-Book of Toronto*, which provided perhaps the first species list for any part of Ontario. Collection of author.

chronicled in the *Dictionary of Canadian Biography* (Roland 1990). Nonetheless, some mystery surrounds his origins. By most accounts, John Hutchison Garnier (Fig. 3) was born to a French Roman Catholic mother and a Huguenot father in Scotland in 1823 and received medical training in Paris and Dublin, obtaining his credentials from Trinity College, Dublin (Anonymous 1898b). However, Garnier's gravestone in South Kinloss Cemetery, Lucknow, Ontario (Fig. 4) bears the inscription:

Dr. Jean H.
Garnier
Born in Garneirville
Ireland 1823
Died
Feb. 1, 1898

and his Irish birth and given name Jean were also recorded in one of his obituaries (Anonymous 1898a). Garneirville, as inscribed on his gravestone, is certainly in error for Garnerville, which is now part of Strandtown, Belfast, County Down, Northern Ireland, and was the residence of Lieutenant-Colonel John Hutchinson Garner (1792–1878) (<https://freepages.rootsweb.com/~rosdavies/genealogy/PLACENAMES/G.htm>). Johnston (1933a, 1933b) reported that Garnier's father came from a long line of distinguished military men and the place and date of Garnier's birth, as well as his full name certainly suggest that Colonel Garner may have been his father or at least a relative. If so, and Garnier was born Garner, why did he change his surname? There were rumors that Garnier had left Ireland as the result of a duel (Johnston 1933a, 1933b). If this were the case, it might explain why he tried to obscure elements of his past (although John Hutchison Garnier does not seem like particularly deep cover if he were, in fact, born John Hutchinson Garner). Another theory is that he took on an entirely different identity when he moved to Canada and coopted part of his name and story from the well-respected Colonel Garner¹. Or perhaps Garnier was an affectation assumed later in life, as his first known publication, in 1871, is signed "Dr. Garner." As to why his grave bears the name Jean instead of John, there is no obvious explanation. Garnier's wife Emily née Willis (1847–1932) lived for an additional 34 years in Lucknow (Johnston 1933a, 1933b) and one would have thought she would have ensured that he was memorialized under his right name.

After leaving the United Kingdom, Garnier spent some time in India, Australia, and the Cape Colony before settling in Canada in the early 1850s, first in Hagersville (now in Haldimand County, south of Hamilton) and then around 1860 in Lucknow, Bruce County, near Lake Huron, where he remained for the rest of his life. As a physician in what was then a pioneer town on the outskirts of western Ontario, in an area known as the Queen's Bush, he had a busy practice and was known for his skill in obstetrics and oculism (ophthalmology). He was also apparently gruff and rude with his patients, traits that have been noted by all of his biographers. He published little in the medical field (e.g., Garner [sic?, see above] 1871) but contributed by translating foreign articles for publication in Canadian medical journals (Johnston 1933a, 1933b).

¹ A Garner family scandal was made public in 1873, when Harriet Howe (initially reported as Hull), working a pianist in a Newark, New Jersey saloon "where she entertained bawds and bacchanalian devotees," was jailed as part of a round-up at that establishment. She claimed to be the daughter of Colonel John Hutchinson Garner and to have fallen on hard times after her ne'er do well husband abandoned her (The Ogdensburg Journal, 31 March 1873 p. 2, as first reported in The Newark Advertiser of 21 March 1873). Eventually she was rescued by her brother "a dashing young fellow, fresh from Ashantee, whither he had gone as a volunteer with Sir Garnet Wolseley" (Chicago Weekly Post and Mail, August 13, 1874, p. 1), a reference to the Third Ashanti War. Harriet was one of seven known children of Colonel J.H. Garner, none of whom were our J.H. Garnier.

Much of Garnier's time and effort was spent on outdoor pursuits. He was an avid hunter and maintained both a flower garden of local renown and a collection of living reptiles and amphibians (Johnston 1933a, 1933b). He was greatly interested in vertebrate natural history and amassed a large collection of preserved vertebrate specimens and accumulated first-hand knowledge of animal behavior and life history. He published several small notes on birds (Garnier 1881a, 1881b, 1882a) and was acknowledged by Thomas McIlwraith (1824–1903), author of *The Birds of Ontario* (1886) and Montague Chamberlain (1844–1924) in *A Catalogue of Canadian Birds* (1887) as the source of various distributional records and natural history observations. However, based on the content of his private “cabinet” and his publishing activity, herpetology seems to have been Garnier's main scientific interest.

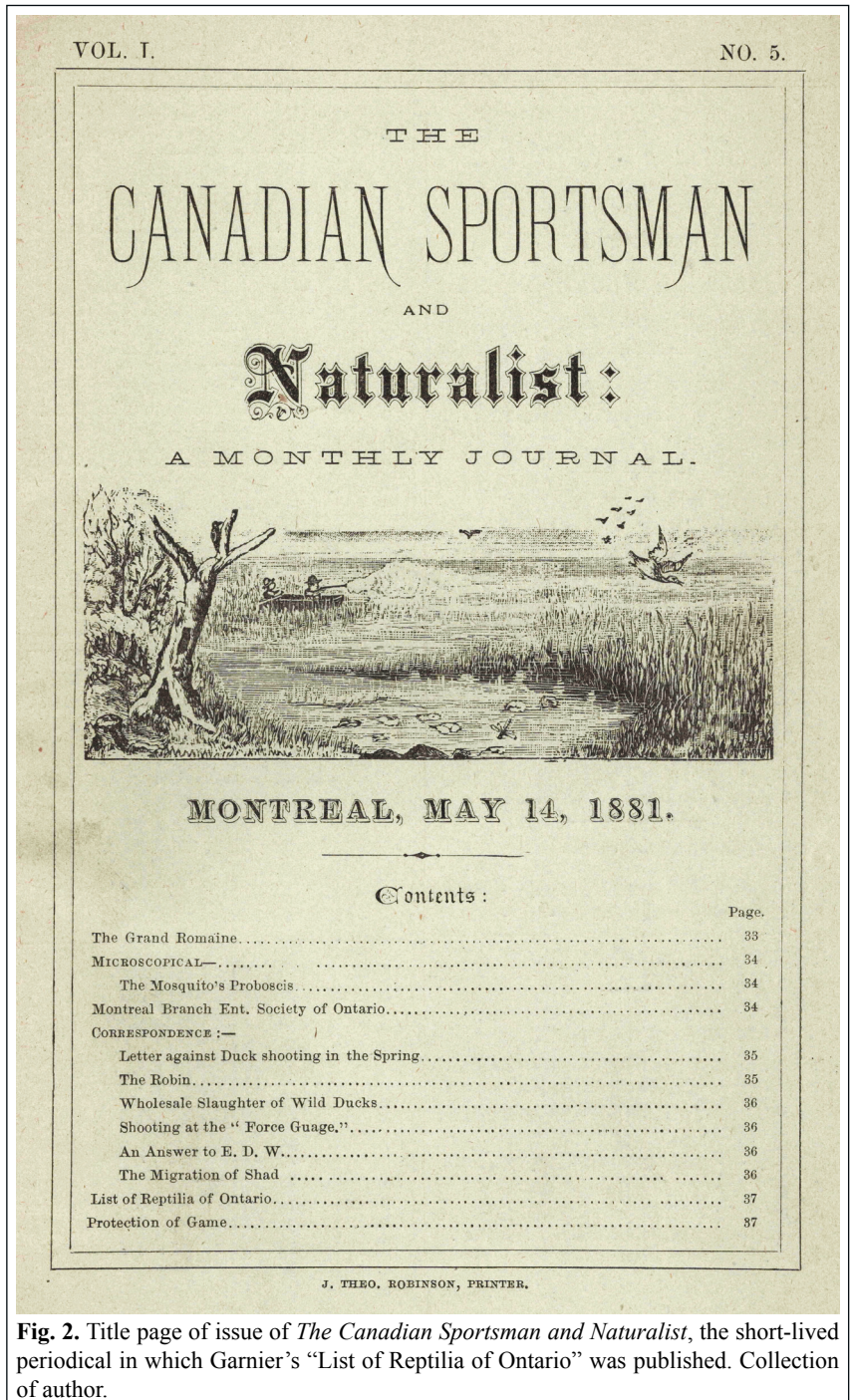
Aside from his biological and medical interests Garnier displayed talent in yet another field. He published a play *Prince Pedro: A Tragedy* (Garnier 1877; Fig. 5) and apparently completed two others — *Dandolo; A Tragedy in Five Acts* and *Moron, the Jew of Syracuse* (given as *Morgan the Jew* by Johnston 1933a, 1933b), and a work of biblical criticism, “The mistakes of Moses” (Roland 1990). Although the latter two plays were copyrighted in the United States in 1893 (Anonymous 1918), neither they, nor the biblical criticism were ever actually published.

Garnier's zoological writings were mostly confined to the 1880s, but he continued his medical practice until his own health prevented it, and he died on 1 February 1898 in Lucknow, leaving a widow, but no children (Anonymous 1898a, 1898b)². Garnier's local fame in his lifetime was considerable and his obituary in the *Toronto Evening Star* (Anonymous 1898a; Fig. 6) referred to him as “a famous authority on reptiles” and noted that he “enjoyed considerable celebrity as a writer on Canadian natural history.”

GARNIER'S NATURAL HISTORY CABINET

Garnier's home “museum” or natural history cabinet was center of his life in Lucknow, and he spared no expense in expanding it (Dymond 1940). Most of his Ontario herpetological

² However, according to Johnston (1933a, 1933b) there is an apocryphal story about Garnier being confronted by a young man who turned out to be his son from England, adding to the mystery of his personal life.



specimens were obtained through his own field work at or near Lucknow, although he regularly visited the St. Clair River on the Michigan border and collected much there as well. Correspondents sent him material from elsewhere in Canada, most notably Quebec, Manitoba, and Nova Scotia, as well as from the United States. The collection was assembled between 1857 and 1890 and is documented in Garnier's still extant collection catalogue held in the Archives of the Royal Ontario Museum (File: SC80-2). Manitoba specimens were provided, in part, by the famous author, artist, and naturalist Ernest Thompson Se-

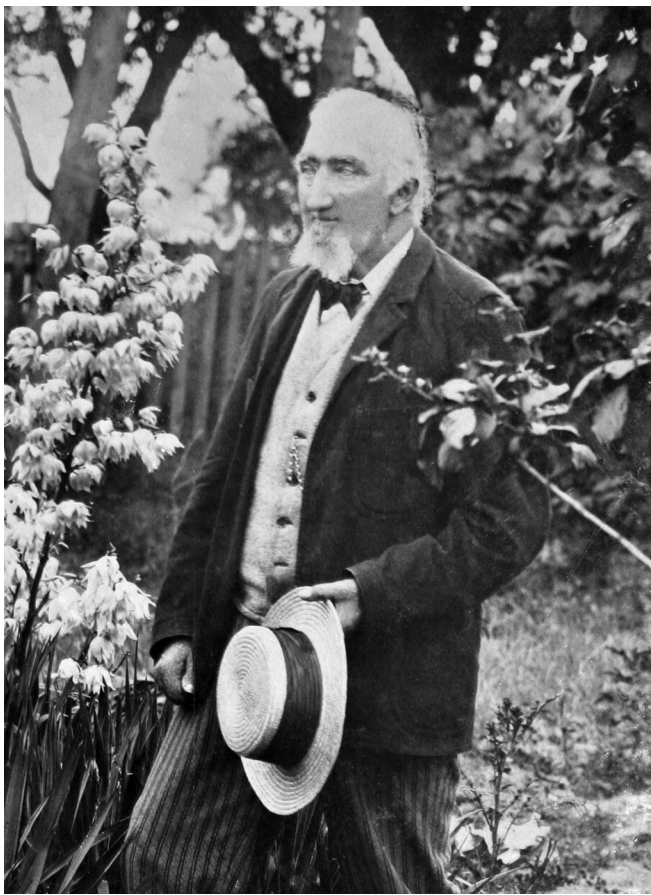


Fig. 3. John Hutchison Garnier in old age. This photograph appeared in his obituary published in *The Globe* on 5 March 1898. Photo courtesy of Jeff Rowell. Original from the John P. Robarts Research Library, University of Toronto.

ton (1860–1946). He obtained material from Pennsylvania and Texas from paleontologist and herpetologist Edward Drinker Cope (1840–1897), from Michigan from ornithologist Morris Gibbs (1856–1908) and from Minnesota from mammalogist Vernon Orlando Bailey (1864–1942). Other correspondents sent large numbers of specimens from Kansas, Texas, and Massachusetts, and Secretary of the Smithsonian, Spencer Fullerton Baird (1823–1887), exchanged material from many American States.

Garnier's collection was global in scope and was enriched by exchanges with naturalists from around the world (Mackenzie 1927), including some of the leading scientists of the day. Material from France and its possessions came from the herpetologist Fernand Lataste (1847–1934) and diplomat and naturalist Victor Collin De Plancy (1853–1924) and herpetologist Eduardo Boscá (1843–1924) exchanged specimens from China and Spain, respectively. Much material came from John Anderson (1833–1900; Fig. 7), Curator and Superintendent of the Indian Museum from 1865 to 1886, who sent animals from India, Burma, Egypt, Palestine, Persia, Yunnan, and Turkistan. Garnier's Pacific material came chiefly from Charles Walter DeVis (1829–1915) in Queensland, Australia and from New Zealand naturalist Thomas Frederick Chee-



Fig. 4. Gravestone of J.H. Garnier in South Kinloss Cemetery, Lucknow, Ontario. From Findagrave.com.

seman (1845–1923). A few specimens from Fiji entered his cabinet courtesy of his brother, also J. H. Garnier, who served as postmaster in Rarotonga in the Cook Islands³. One of

³ Interestingly, given the uncertainty of John Hutchison Garnier's birth name, this J.H. Garnier appears as J.H. Garner in at least one published source (Anonymous 1898c), although official records seem to consistently list him as Garnier. He apparently immigrated to Canada with his (presumably) older brother (Caswell 1936). His pathway from frontier Ontario to public service in the Cook Islands is not clear. He departed Rarotonga for Auckland in late 1898 after being dismissed, presumably for incompetence (Whimp 2008).

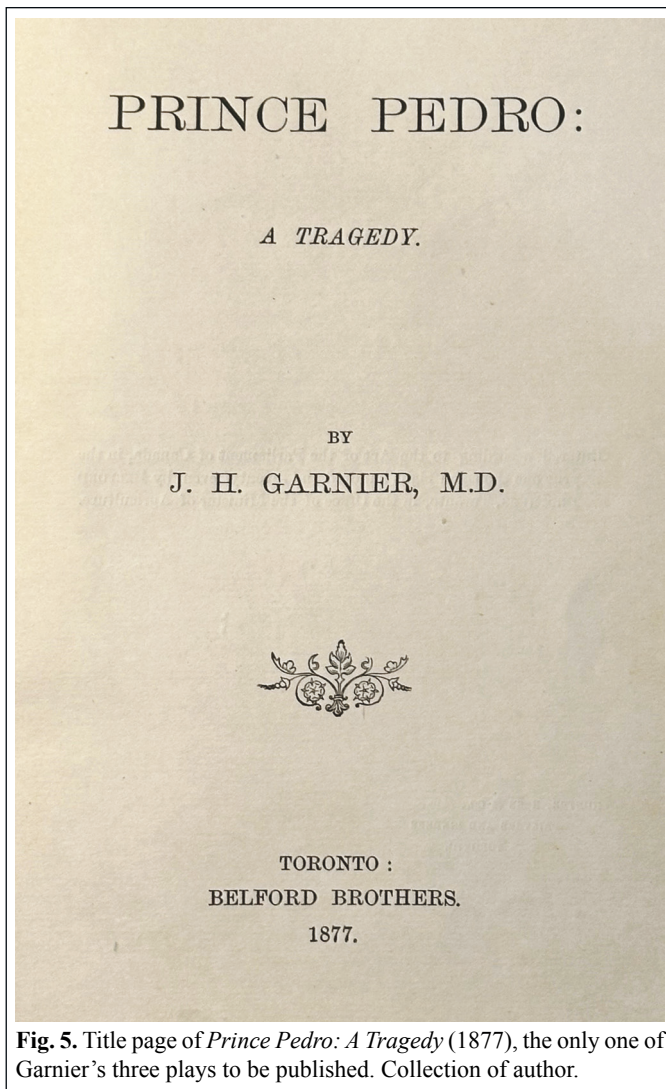


Fig. 5. Title page of *Prince Pedro: A Tragedy* (1877), the only one of Garnier's three plays to be published. Collection of author.

Garnier's most active correspondents was the naturalist and former American Consul on Mauritius, Nicolas Pike (1818–1905; Fig. 8), who provided material from that island as well as from the vicinity of New York City and from Alabama and Florida. Pike was one of few people to have seen the now-extinct Round Island Boa, *Bolyeria multocarinatus*, which he wrote about in his spectacularly-titled book, *Subtropical Rambles in the Land of the Aphanapteryx* (1873), but he is also infamous for having introduced House Sparrows to New York in the 1850s.

Evidence of some of Garnier's reciprocal exchanges is verified in the published catalogues of institutions with which he dealt. Vertebrate material, including 51 snakes from Ontario (Rowell 2012), were exchanged to John Anderson at the Indian Museum and were subsequently listed in W.L. Sclater's (1891a, 1891b, 1892) *Catalogues* of that institution (Fig. 9), and material sent to Cope eventually appeared in Doris Cochran's (1961) list of herpetological types in the U.S. National Museum.

Garnier prepared or completed the catalogue of his collections in 1891 (Fig. 10) and in that same year he donated

DR. GARNIER DEAD.

A Famous Authority on Reptiles Passes Away at Lucknow, Ontario.

LUCKNOW, Feb. 5.—The death occurred at Lucknow of Dr. Jean H. Garnier, one of the leading naturalists of Canada. He was a specialist in reptology, and had just finished reading the proofs of a publication entitled "The Reptiles of Canada," which was intended to be published in the spring.

The doctor was an Irishman, and a graduate of Trinity College, Dublin. He came to Canada over fifty years ago, and trapped and hunted with the Indians of the neighborhood where he settled for the love of adventure and his love of the study of nature.

The doctor leaves an exceedingly large collection, although at the time of the fire at the Toronto University, the University authorities purchased enough of his collection to take the place of that destroyed.

The doctor was a correspondent of *Outing* and other sporting papers, and enjoyed considerable celebrity as a writer on Canadian natural history. He enjoyed a large practice until age forced him to relinquish it. He leaves a widow.

Fig. 6. J.H. Garnier's obituary in the *Toronto Evening Star* of 5 February 1898. Unlike other sources, the information provided here is consistent with that on his gravestone.

473 specimens to the Biological Museum of the University of Toronto (Dymond 1940); another ~2000 specimens were purchased later the same year (the year of sale was incorrectly stated to be 1901 by Johnston 1933a, 1933b). Although representing all terrestrial vertebrate groups, the herpetological component was dominant. According to Mackenzie (1927:356) "his collection of reptilia was the most complete in the land in his time." The entire collection included 760 birds (mounted and study skins), 245 mammal specimens, 166 salamanders, 384 anurans, 538 snakes, and 360 other reptiles (Johnston 1933a, 1933b; Dymond 1940; Roland 1990). Of these, the majority were exotic, but there were from Ontario: 84 snakes (representing the currently recognized taxa *Regina septemvittata*, *Nerodia sipedon*, *Storeria dekayi*, *S. occipitamaculata*, *Thamnophis sirtalis*, *T. butleri* (see Table 1), *T. saurita*, *Lampropeltis triangulum*,



Fig. 7. Portrait bust from the grave monument in Dean Cemetery, Edinburgh, Scotland of John Anderson (1833–1900), Curator and Superintendent of the Indian Museum and one of Garnier's correspondents. © Stephendickson. Licensed under the Creative Commons [https://en.wikipedia.org/wiki/Creative_Commons] Attribution-Share Alike 4.0 International [https://creativecommons.org/licenses/by-sa/4.0/deed.en] license.

Diadophis punctatus, *Opheodrys vernalis*, *Heterodon platirhinos*, *Pantherophis vulpinus*, *Crotalus horridus*, *Sistrurus catenatus*), 26 urodeles (*Ambystoma maculatum*, *A. jeffersonianum* complex, *Necturus maculosus*, *Desmognathus fuscus* [identity doubtful], *Plethodon cinereus*, *Notophthalmus viridescens*), and 131 frogs (*Lithobates pipiens*, *L. palustris*, *Aquarana catesbeiana*⁴; *A. clamitans*, *A. septentrionalis*, *Boreorana sylvaticus*, *Dryophytes versicolor*, *Pseudacris crucifer*, *P. triseriata*, and *Anaxyrus americanus*). These were added to the collection between 1877 and 1890 and were from localities in Ontario south of about 46.5°N.

⁴ Recognition of *Aquarana* and *Boreorana* follows Frost (2025), although some workers place these generic names in the synonymy of *Lithobates* or *Rana*.

Garnier's entire collection was subsequently transferred to the Royal Ontario Museum of Zoology in 1932⁵. The history of the collection is documented by Dymond (1940) and its significance noted by Roland (1990) and Cook (2007). Today, at least 843 specimens from the Garnier collection survive in the Royal Ontario Museum. However, of these, only 14 are Canadian with 12 from Ontario, representing *Pantherophis vulpinus* (2), *Aquarana clamitans* (1), *Aquarana septentrionalis* (2), *Pseudacris crucifer* (1), *Pseudacris triseriata* (1), *Ambystoma laterale* (1), *Necturus maculosus* (1), *Lampropeltis triangulum* (1), *Regina septemvittata* (1) and *Thamnophis sirtalis* (1). This number is likely an underestimate, however, as some of Garnier's material appears to have entered the collection with incomplete data (pers. comm., Amy Lathrop).

GARNIER'S PUBLICATIONS

I have been able to identify eight partly or wholly herpetological publications by John Garnier, as well as several dealing with birds and mammals. According to one of his obituaries (Anonymous 1898a) Garnier was a correspondent of *Outing* (presumably the American magazine of this name, 1881–1923) but I was unable to verify any contributions on amphibians and reptiles in this outlet. His first zoological publications appeared in *The Canadian Sportsman and Naturalist*, a short-lived (1881–1883) monthly serial published in Montreal and edited by William Couper (????–ca. 1890), a printer, publisher and taxidermist, who himself published fairly extensively on both systematic and economic entomology (Paradis 1982). It included mostly short articles relating to hunting, fishing, and natural history. The subscription price was one dollar, but the journal was subsidized by revenue from a variety of advertisements for photographers and sail and tent makers, clothes, coffee, disinfectants, scientific instruments, fishing tackle, glass eyes for taxidermy, and the Fish and Game Protection Club of the Province of Quebec. The journal ceased publication with nos. 11/12 of volume 3 in December 1883, having published a total of 288 pages, with pagination continuous between volumes. It is available online through Biodiversity Heritage Library and WorldCat lists hard copy holdings by about 25 institutions in Canada, the United States, and Australia.

Garnier's first publication in *The Canadian Sportsman* dealt with Robins (Garnier 1881a), arguing that they were delicious fare. This engendered a rebuttal and Garnier (1881d) returned to the topic again later in the same year. Another ornithological paper on the Red Crossbill followed (Garnier 1882a). He also published two papers on mammals, the first on deer "horns" (Garnier 1881c) also precipitated some re-

⁵ The Royal Ontario Museum of Zoology, created in 1912, was one of five separate museums originally comprising the Royal Ontario Museums. In 1955 the separate museums became divisions within the Royal Ontario Museum.



SUB-TROPICAL RAMBLES
IN
THE LAND OF THE APHANAPTERYX.

PERSONAL EXPERIENCES, ADVENTURES, AND WANDERINGS
IN AND AROUND
THE ISLAND OF MAURITIUS.

BY NICOLAS PIKE.



NEW YORK:
HARPER & BROTHERS, PUBLISHERS,
FRANKLIN SQUARE.
1873.

Fig. 8. Nicolas Pike (1818–1905), American consul on Mauritius and naturalist (left). Image from frontispiece of Pike’s 1873 book *Sub-Tropical Rambles in the Land of the Aphanapteryx* (right). Pike’s herpetological claims to fame include reporting on the now extinct Round Island Boa, *Bolyeria multocarinata*, and confirming that the red eft is the juvenile terrestrial stage of *Notophthalmus viridescens*. Collection of author.

spones, including one from the editor. The second, on the Red Lynx (Garnier 1882d), was less controversial. His herpetological papers include a list of the reptiles and amphibians of Ontario (Garnier 1881b) — the main focus of this paper (see below), and two subsequent papers on the natural history of his hometown of Lucknow (Garnier 1882b), one covering all groups of terrestrial vertebrates, and another about the natural history of *Hyla Pickeringii* (syn. *Pseudacris crucifer*) (Garnier 1882c). The first of these augmented Garnier’s (1881b) original provincial list of taxa, adding four additional species (Table 1). Perhaps his most widely cited herpetological contribution was a lengthy paper on the Mink Frog (Garnier 1883) in *The American Naturalist*. Unlike *The Canadian Sportsman and Naturalist*, this journal had, as it still does, a wide distribution and ensured that Garnier’s observations would be seen by many. It was cited in various works including *Familiar Life in Field and Forest* (Matthews 1898) and was recently included in the anuran bibliography of Dodd (2022).

With the demise of *The Canadian Sportsman and Naturalist* in 1883, Garnier (1884) found new outlets for his work. The first such paper was on the taxonomy of the Massasauga and was published in the *Canadian Science Monthly*, another short-lived periodical that was published in Wolfville, Nova Scotia only from 1883 to 1885, first as the *Acadian Scientist* (through Volume 2, issue 2). In this paper he synonymized *Candisona* [sic, *Caudisona*] *edwardsii* with *C. tergeminus* (the name he applied to *Sistrurus catenatus*). Uncharacteristically, this paper escaped the notice of both Klauber (1956) and Wright and Wright (1962) whose bibliographies are famously thorough.

Garnier published two papers in the *Transactions of the Canadian Institute*. The Canadian Institute, now the Royal Canadian Institute for Science, is the oldest scientific society in Canada. It was founded in 1849 and published a series of journals under different titles from 1852 to 1969. Garnier was elected a member of the Institute in March 1889, presumably in recognition of his publications in the *Transactions*. In the

LIST OF THE SNAKES IN THE INDIAN MUSEUM.			
106. LIOPHIS MERREMII, (Neuwied).			
Günther, Cat. Col. Snakes, p. 44.			
Distribution—Tropical South America.			
1 "South America"	British Mus. [Ex.]	4745.	
107. LIOPHIS REGINAE, (Linn.).			
Günther, Cat. Col. Snakes, p. 46.			
Distribution—South America and West Indies?			
1 West Indies	G. E. Dobson	8431.	
108. DIADOPHIS PUNCTATUS, (Linn.).			
Garman, Snakes N. America, p. 72.			
Distribution—Eastern States and Canada.			
1 Ontario, Canada.	Dr. J. H. Garnier, [Ex.]	12222.	
109. OPHIBOLUS TRIANGULIGERUS, (Boie).			
Garman, Snakes N. America, p. 65.			
Distribution—Canada and the States.			
1 Lake Erie, Canada	Dr. J. H. Garnier, [Ex.]	12270.	
2 Lake Scanlanou, Ontario,			
Canada	Dr. J. H. Garnier, [Ex.]	12169-70.	
2 Ontario, Canada	Dr. J. H. Garnier, [Ex.]	12112, 12229.	
2 Texas, U. S. A.	Dr. J. H. Garnier, [Ex.]	12268-9.	
1 Chehuahua, Mexico	Dr. J. H. Garnier, [Ex.]	12273.	
110. OPHIBOLUS GETULUS, (Linn.).			
Garman, Snakes N. America, p. 68.			
Distribution—South Eastern States of North America.			
2 N. Carolina	Rev. F. Fitzgerald, A. S. B.	7213-4.	
111. RHINOCEILUS LECONTEI, Baird and Girard.			
Garman, Snakes N. America, p. 73.			
Distribution—South California and Mexico.			
1 Texas	Dr. J. H. Garnier [Ex.]	12246.	
112. CYCLOPHIS VERNALIS, (Harlan).			
Garman, Snakes N. America, p. 39.			
Distribution—N. America, east of the Rocky Mountains.			
2 Ontario, Canada	Dr. J. H. Garnier, [Ex.]	12156, 12206.	

Fig. 9. Listing of some of the snakes exchanged to the Indian Museum in Sclater's (1891) *List of Snakes in the Indian Museum*. These include snakes from Ontario collected by Garnier himself and others from the United States and Mexico that he had obtained by exchange. Collection of author.

first paper Garnier (1888a) described a new *Necturus* from the Maitland River, Ontario as *Menobranthus Latastei* (see below). In the second, on "Snake poisons" (Garnier 1888b), he proposed a remedy of iodine of potash followed by sweet spirit of nitre for the treatment of the bite of the "Massissauga or *Caudisona Tergenina*." In the paper he also advocated for testing snakebite remedies on condemned prisoners! In addition, the Annual Report of the Canadian Institute for 1882–83 lists a presentation given by Garnier on 23 February 1883 on "The Poisonous Snakes of North America." Although this was never published, Roland (1990) indicated that a copy of the corresponding manuscript was preserved in box 27 of the

J.L. Baillie Collection (ms. coll. 127) at the Thomas Fisher Rare Book Library of the University of Toronto.

Garnier's last known published herpetological work was a list of 33 Ontario snake species (Garnier 1894) published in the Toronto newspaper *The Empire*, one of the precursors of the national newspaper, *The Globe and Mail* (see below). Garnier's interest in herpetology, however, continued throughout life and he presumably intended to publish a book-length work "The Reptiles of Ontario." One of his obituaries (Anonymous 1898a) stated that he had just finished reading proofs for the book, which was to be published in the Spring of that year. This never materialized, although the manuscript exists in the archives of the Royal Ontario Museum (Archives SC80).

GARNIER'S LISTS OF ONTARIO AMPHIBIANS AND REPTILES

Garnier's main contribution to the herpetology of Ontario was "List of Reptilia of Ontario" (Fig. 11) published in *The Canadian Sportsman and Naturalist*. The information provided with each entry was limited, sometimes giving one or more localities or providing a brief statement about the features or ecology of the animal. The "List" included an impressive 65 species (and varieties) of amphibians and reptiles. Shortly thereafter he added four more species to the Ontario fauna in his paper on the natural history of Lucknow (Garnier 1882b): *Chorophyllus triseriatus*, *Amyda mutica*, *Amblystoma Jeffersoni* and *Scotophis Allighaniensis* (Table 1). These 69 taxa compare to the 48 species and subspecies recognized by Logier (1937, 1939) and the 54 taxa (including 50 full species) of recent and historically present amphibians and reptiles recognized today (ORAA 2023)⁶.

Garnier's knowledge of taxonomy was limited by his available resources. Having no curated collections with which to compare his own material, his determinations would have been dependent on the literature available to him, likely papers sent to him by the correspondents with whom he exchanged material. It is evident that for snakes, Garnier largely followed the taxonomy of Baird and Girard (1853; Fig. 12),

⁶ The boundaries of Ontario were significantly different in 1881 than they are today, and the current provincial borders were not achieved until 1912. At the time, northern Ontario was part of the North-West Territories and part of what is today far western Ontario was in the District of Keewatin. Although all of the 54 species and subspecies (exclusive of unnamed unisexual ambystomatids) currently recognized as present or historically present in Ontario occurred within the boundaries of the province in Garnier's time, his collection and his knowledge of the herpetofauna from correspondents was concentrated on the settled parts of the province where the majority of the species occur. *Pseudacris maculata* and the subspecies *Notophthalmus viridescens louisianensis*, *Thamnophis sirtalis parietalis*, and *Chrysemys picta belli* are restricted to areas beyond the scope of Garnier's personal knowledge and two other taxa, *Ambystoma texanum* and *Nerodia sipedon insularum*, are restricted in Ontario (and Canada) to Pelee Island, which had not yet been herpetologically investigated in Garnier's time (King et al. 1997).

Table 1. Nominal taxa in Garnier (1881b) “List of Reptilia of Ontario” (see also Figure 11) and additions from Garnier (1882b) “Notes on the natural history of Lucknow, Ont.” Additions of 1882 are preceded by an asterisk (*). Garnier’s names are given verbatim (including question marks, when present), with my additions in square brackets ([]). Current Name is the name corresponding to Garnier’s name and does not necessarily reflect the actual identity of the taxon referred to. In the column “ONT,” X indicates that the named taxon is known to occur (or to have occurred in historical times) in Ontario. The right-hand column gives the likely identity of the taxon based on information about distribution or appearance provided by Garnier, as well as other remarks.

Garnier (1881)	Current Name	ONT	Probable Identity; Remarks
<i>Chelopis insculptus</i>	<i>Glyptemys insculpta</i>	X	<i>Glyptemys insculpta</i>
<i>Nanemys guttatus</i> [sic]	<i>Clemmys guttata</i>	X	<i>Clemmys guttata</i>
<i>Emys meleagris</i>	<i>Emydoidea blandingii</i>	X	<i>Emydoidea blandingii</i>
<i>Chrysemys picta</i>	<i>Chrysemys picta picta</i>	—	<i>Chrysemys picta marginata</i> ; <i>C. p. picta</i> is extralimital; <i>C. p. belli</i> occurs in western Ontario and was likely unknown to Garnier.
[C.] <i>P. var. marginata</i>	<i>Chrysemys picta marginata</i>	X	<i>Chrysemys picta marginata</i>
<i>Malacoclemys</i> [sic] <i>geographica</i>	<i>Graptemys geographica</i>	X	<i>Graptemys geographica</i>
<i>M.</i> [sic] <i>pseudo-geographica</i>	<i>Graptemys pseudo-geographica</i>	—	<i>G. geographica</i> ; <i>G. pseudo-geographica</i> is extralimital. Considered a variety of <i>geographica</i> by Garnier.
<i>Aromochelys odoratus</i>	<i>Sternotherus odoratus</i>	X	<i>Sternotherus odoratus</i>
<i>Chelydra serpentina</i>	<i>Chelydra serpentina</i>	X	<i>Chelydra serpentina</i>
<i>Aspidonectes spinifer</i>	<i>Apalone spinifera</i>	X	<i>Apalone spinifera</i>
* <i>Amyda mutica</i> (?)	<i>Apalone mutica</i>	—	<i>A. spinifera</i> ; <i>A. mutica</i> is extralimital
<i>Eumeces fasciatus</i>	<i>Plestiodon fasciatus</i>	X	<i>Plestiodon fasciatus</i>
<i>E. septentrionalis</i>	<i>Plestiodon septentrionalis</i>	—	<i>P. fasciatus</i> ; <i>P. septentrionalis</i> is extralimital.
<i>E. anthracinus</i>	<i>Plestiodon anthracinus</i>	—	<i>P. fasciatus</i> ; <i>P. anthracinus</i> is extralimital.
<i>Heterodon platyrhinus</i> [sic] var. <i>niger</i>	<i>Heterodon platyrhinus</i>	X	Melanistic form of <i>H. platyrhinus</i> ; The species is now extirpated from Garnier’s localities of Toronto and Port Hope (COSEWIC 2021; ORAA 2023).
<i>Nerodia sipedon</i>	<i>Nerodia sipedon</i>	X	<i>Nerodia sipedon</i>
<i>N. erythrogaster</i>	<i>Nerodia erythrogaster</i>	—	<i>Nerodia sipedon</i> ⁷
<i>N. niger</i>	<i>Nerodia sipedon</i>	X	Considered as a likely synonym of <i>N. sipedon</i> by Garnier.
<i>Regina rigida</i>	<i>Liodytes rigida</i>	—	<i>Regina septemvittata</i> ; <i>L. rigida</i> is extralimital.
<i>R. lebevis</i> (?)	<i>Storeria occipitomaculata</i>	X	<i>Regina septemvittata</i> ⁸
<i>Storeria occipito-maculata</i>	<i>Storeria occipitomaculata</i>	X	<i>Storeria occipitomaculata</i>
<i>S. DeKayi</i>	<i>Storeria dekayi</i>	X	<i>Storeria dekayi</i>
<i>Eutania</i> [sic] <i>saurita</i>	<i>Thamnophis saurita</i>	X	<i>Thamnophis saurita septentrionalis</i>
<i>E. radix</i>	<i>Thamnophis radix</i>	—	<i>Thamnophis butleri</i> ; Garnier’s record is the first record of <i>T. butleri</i> from Ontario (see text).
<i>E. sirtalis</i>	<i>Thamnophis sirtalis sirtalis</i>	X	
<i>E. dorsalis</i>	<i>Thamnophis sirtalis dorsalis</i>	—	<i>T. s. sirtalis</i> ; <i>T. s. dorsalis</i> is extralimital.
<i>E. ordinata</i>	<i>Thamnophis sirtalis sirtalis</i>	X	<i>T. s. sirtalis</i> ; Considered by Garnier as the young of <i>E. dorsalis</i> .

Garnier (1881)	Current Name	ONT	Probable Identity; Remarks
<i>E. ordenoides</i> [sic]	<i>Thamnophis ordenoides</i>	—	<i>T. s. sirtalis</i> ; <i>T. s. ordinoides</i> is extralimital.
<i>E. parietalis</i>	<i>Thamnophis sirtalis parietalis</i>	X	Misidentification for <i>T. s. sirtalis</i> ; <i>T. s. parietalis</i> occurs only west of 87°W in Ontario, whereas Garnier's specimen was from Magnetawan (79.64°W).
<i>E. vagrans</i>	<i>Thamnophis elegans vagrans</i>	—	<i>T. s. sirtalis</i> ; <i>T. s. vagrans</i> is extralimital.
<i>E. elegans</i>	<i>Thamnophis elegans elegans</i>	—	<i>T. s. sirtalis</i> ; <i>T. s. elegans</i> is extralimital.
<i>E. Pickeringii</i>	<i>Thamnophis sirtalis pickeringii</i>	—	<i>T. s. sirtalis</i> ; <i>T. s. pickeringii</i> is extralimital.
<i>E. obscura</i>	<i>Thamnophis sirtalis sirtalis</i>	X	Considered by Garnier "scarcely admissible, even as a variety."
<i>Bascanium constrictor</i> (?)	<i>Coluber constrictor</i>	X	<i>Pantherophis alleghaniensis spiloides</i> ; Garnier's reference to this as a "Black Snake" and the stated locality of Ganonoque are consistent with <i>Pantherophis</i> but not <i>C. constrictor</i> .
<i>Scotophis vulpinus</i>	<i>Pantherophis vulpinus</i>	X	Garnier's localities of Kent County and Mud Creek are consistent with the distribution of the species, but his report of a specimen 7 feet 11 inches in length is exaggerated.
<i>Cyclophis vernalis</i>	<i>Ophiodryx vernalis</i>	X	<i>Ophiodryx vernalis</i>
<i>Diadophis punctatus</i>	<i>Diadophis punctatus edwardsi</i>	X	<i>Diadophis punctatus edwardsi</i>
<i>D. punctatus</i> var. <i>amabilis</i>	<i>Diadophis punctatus amabilis</i>	—	<i>D. p. edwardsi</i> ; <i>D. p. amabilis</i> is extralimital; the subspecies was considered doubtfully distinct by Garnier.
<i>Ophibolus doliatus</i> var. <i>triangulus</i>	<i>Lampropeltis triangulum</i>	X	<i>Lampropeltis triangulum</i>
<i>Crotalus horridus</i>	<i>Crotalus horridus</i>	X	Seen "on the mountain [the Niagara Escarpment] a few miles east of Hamilton" in 1859, one collected "not far from Niagara" in 1873.
<i>Crotalophorus tergemina</i>	<i>Sistrurus tergeminus</i>	extirpated	<i>Sistrurus catenatus</i> ; <i>S. tergeminus</i> is extralimital. Garnier's record from Tilberry Marsh is presumably near Tilbury, in an area from which the species has been extirpated.
* <i>Scophotis Allighaniensis</i> [sic]	<i>Pantherophis alleghaniensis spiloides</i>	X	Reported from Essex but not present in Garnier's own collection.
<i>Rana helecina</i> [sic]	<i>Lithobates pipiens</i>	X	<i>Lithobates pipiens</i>
<i>R. pulustris</i> [sic]	<i>Lithobates palustris</i>	X	<i>Lithobates palustris</i>
<i>R. clamitans</i>	<i>Aquarana clamitans</i>	X	<i>Aquarana clamitans</i>
<i>R. [clamitans]</i> var. <i>caeruleus</i> ⁹	<i>Aquarana clamitans</i> ?	X	Presumably intended as <i>R. clamitans</i> var. <i>caeruleus</i> "introduced as a local variety." Whether intended as a subspecific name or a color variety is unclear. See text.
<i>R. Catesbeyana</i> [sic]	<i>Aquarana catesbeyana</i>	X	<i>Aquarana catesbeyana</i>
<i>R. [Catesbeyana]</i> var. <i>rufus</i>	<i>Aquarana catesbeyana</i> ?	X	Presumably intended as <i>R. catesbeyana</i> var. <i>rufus</i> "introduced as a larger variety" from St. Clair Flats and Bruce County. Whether intended as a subspecific name or a color variety is unclear. See text.
<i>R. sylvatica</i>	<i>Boreorana sylvatica</i>	X	<i>Boreorana sylvatica</i>
<i>R. sylvatica</i> var. <i>Cantabrigensis</i>	<i>Boreorana sylvatica</i>	X	<i>Boreorana sylvatica</i>
<i>Pelobates Americanus</i>	previously unrecorded replacement name	X	<i>Aquarana septentrionalis</i> ; Garnier states "same as <i>R. circulosa</i> , &c. Hoosier Frog" [= <i>Lithobates areolatus</i>] and Garnier (1883) makes it clear that he considered <i>areolatus</i> and <i>septentrionalis</i> to be synonyms.
<i>Hyla versicolor</i>	<i>Dryophytes versicolor</i>	—	<i>Dryophytes versicolor</i>

Garnier (1881)	Current Name	ONT	Probable Identity; Remarks
<i>H. Andersonii</i>	<i>Dryophytes andersonii</i>	X	Intended identity uncertain, although Garnier's text suggested that he considered this to be a color morph of <i>Dryophytes versicolor</i> . <i>D. andersonii</i> is extralimital.
<i>H. Pickeringii</i>	<i>Pseudacris crucifer</i>	—	<i>Pseudacris crucifer</i>
<i>Acris Gryllus</i> var. <i>crepitans</i>	<i>Acris crepitans</i>	X	<i>Pseudacris</i> sp.?, <i>Acris blanchardi</i> , now extirpated (ORAA 2023), was the only cricket frog in Ontario and was limited to the extreme southwest of the province. Garnier's (1882lb, 1882c) statements about its call suggest <i>Pseudacris triseriatus</i> or <i>P. crucifer</i> .
<i>Acris gryllus</i> var. <i>gryllus</i>	<i>Acris gryllus</i>	—	<i>Pseudacris</i> sp.?, See above. <i>Acris gryllus</i> is extralimital.
<i>Bufo lentiginosus</i> var. <i>Americanus</i>	<i>Anaxyrus americanus</i>	—	<i>Anaxyrus americanus</i>
<i>B. lentiginosus</i> var. <i>niger</i>	<i>Anaxyrus americanus</i> ?	X	This name has not been noted in the literature. It likely refers to a blackish color morph of <i>A. americanus</i> . Whether intended as a subspecific name or a color variety is unclear. See text.
* <i>Chorophyllus</i> [sic] <i>triseriatus</i>	<i>Pseudacris triseriata</i>	X	<i>Pseudacris triseriata</i>
<i>Diemythylus viridescens</i>	<i>Notophthalmus viridescens</i>	X	<i>Notophthalmus viridescens viridescens</i>
<i>D. mineatus</i> [sic]	<i>Notophthalmus viridescens</i>	X	Garnier used the common name Red Eft for <i>D. mineatus</i> , which he regarded as distinct from <i>D. viridescens</i> . ¹⁰
<i>Desmognathus</i> [sic] <i>niger</i>	<i>Desmognathus fuscus</i>	X	Identity unknown. <i>Desmognathus fuscus</i> is known only from the Niagara area. Garnier's specimen was received from "Mr. Brodie, Toronto" but it is unclear if Toronto is the source of the specimen. Described simply as "Black Salamander," an ambystomatid might be implied.
<i>Plethodon erythronotus</i>	<i>Plethodon cinereus</i>	X	<i>Plethodon cinereus</i>
<i>P. var. cinereus</i>	<i>Plethodon cinereus</i>	X	<i>Plethodon cinereus</i>
<i>Ambystoma punctatum</i>	<i>Ambystoma maculatum</i>	X	<i>Ambystoma maculatum</i>
<i>Necturus lateralis</i> ; <i>menobanchus</i>	<i>Necturus maculosus</i>	X	<i>Necturus maculosus</i>
<i>N. Huronensis</i>	<i>Necturus maculosus</i>	X	Explicitly described as a new species. Only two specimens obtained, no locality given. See text for discussion.
* <i>Ambystoma Jeffersoni</i> [sic]	<i>Ambystoma jeffersonianum</i>	X	Likely <i>A. laterale</i> as the similar <i>A. jeffersonianum</i> does not occur in Hyde Park (London, Ontario), the locality signaled by Garnier.

⁷ *Nerodia erythrogaster* was not listed among possible Ontario species by MacCulloch (2002) or ORAA (2023). However, it occurs in southern Michigan with records from Oakland County, approximately 40 km west of Lake St. Clair. Garnier's single locality was somewhere on the Canadian side of the lake.

⁸ *Coluber leberis* Linnaeus, 1758 is a senior synonym of *Storeria occipitomaculata* (Storer, 1839) but was suppressed by the ICZN (Anonymous 1962). Baird and Girard (1853), however, applied the name to the Queensnake and this is certainly the usage employed by Garnier.

⁹ Although in this instance and *R. var. rufus* below, no species name is given in Garnier's listing, it is implicit that the species immediately above is implied.

¹⁰ The entire life cycle of *Notophthalmus viridescens* was not elucidated until the work of Kelly (1878), of which Garnier was likely not aware. Although the terrestrial eft stage and the aquatic adult were suspected to be conspecific for several decades prior (Gage 1891), this was not universally accepted until after Garnier's Ontario *List* was published. Garnier's correspondent Nicolas Pike (see text) was instrumental in confirming the transformation between life stages (Pike 1886).

375	<i>Coluber Porphyraceus</i> .	Sabagai, Daigiling, Borneo	1883.
376	<i>Eutainia Merciana</i> .	Dr. Anderson	1883.
377	<i>Eutainia Elegans</i>	Elsworth, Kansas	1884
378	<i>Ephitelus Sagi</i> .	Dr. Jeffries	1884
379	<i>Tragopsis Prasinus</i> .	High Bluffs, Manitoba	1884
380	<i>Heterodon Niger</i> .	J. Morgan	1884
381	<i>Tamias Virideflavus</i> .	Holbrook, Kansas	1884
382	<i>Diadophis Pictus</i> atd.	Dr. Jeffries, 9 Jan	1884
383	<i>Tragopsis prasinus</i> .	Johore, India	1883.
384	<i>Eutainia Dorsalis</i> var. <i>Obscura</i> .	J. M. India	1883.
385	<i>Eutainia Dorsalis</i> .	Eck River, Minnesota	1885.
386	<i>Nastrophis Amatus</i> .	V. Bailey	1885.
387	<i>Pericopsis sibilans</i> .	Environ, Marselle, France	1884
388	<i>Rhinorchilus Vacontii</i> .	P. Sipi.	1884
389	<i>Boa Constrictor</i> (13 ft long)	Sydney, Australia	1883
390	<i>Murelia Variegata</i> 11 ft	New South Wales	1883
391	<i>Gonyosoma oxycephala</i> .	Johore, India	1883
	- a tree snake -	Imp. Mus. Ind.	1883
		Lake St. Clair, F. lat. Ont	1883
		J. H. G.	1883
		Hyde Park, Ont.	1883
		J. H. G.	1883
		Helotes, Texas	1881.
		Mamock	1881.
		Laghouat, Tunis	1885
		F. Lalaste	1885
		Cosque, Texas	1884
		J. Menden	1884
		Brazil	1885.
		H. Attwater	1885.
		Brisbane.	1885
		De Vis	1885
		Bengal.	1885.
		Imp. Mus. (Calcutta)	1885.

Fig. 10. Page from Garnier's 1891 catalogue of his collection of non-venomous snakes that were sold to the University of Toronto in that year. This page includes several Ontario specimens collected by Garnier (384, 385) as well as exotic snakes received from international correspondents including John Anderson in India (375, 383, 391), Walter De Vis in Australia (390) and Fernand Lataste in France (387). Year dates of acquisition are indicated at the right of the page. From the Archives of the Royal Ontario Museum, courtesy of Amy Lathrop.

but he also mentioned Edward Drinker Cope (1840–1897) and David Starr Jordan (1851–1931) in his “List.” Jordan’s (1880) popular *Manual of the Vertebrates of the Northern United States*, then in its third edition, would have been the latest work to effectively cover the herpetofauna of Ontario and so, may have been of particular use to him, although it is not explicitly cited by Garnier. Because of his reliance on Baird and Girard (1853), which was written before many

groups — such as garter snakes — had been critically reviewed, Garnier had an inflated list of names that he thought might apply to his local fauna.

Making sense of Garnier’s taxa is not straight-forward. In several cases (*Nerodia niger*, *Eutainia ordinata*, *E. obscura*, and *Diadophis punctatus* var. *amabilis*) he expressed doubts about the validity of the taxa he listed. Another issue involves his use of the term variety (var.). In several cases he clearly employed the term in the sense of a subspecies (e.g. *Bufo lentiginosus* var. *americanus* or *Acris Gryllus* var. *crepitans*), following usage of the time. However, in three cases he seemingly uses the term “var.” to describe a color variety. The alternative interpretation is that Garnier coined three new subspecific names: *B. lentiginosus* var. *niger*, *Rana [clamitans]* var. *caeruleus*, and *Rana [Catesbeyana]* var. *rufus*. None of these combinations have otherwise appeared in the systematic literature and, if considered validly described, these nomina would be junior synonyms of *Anaxyrus americanus*, *Aquarana clamitans* and *Aquarana catesbeiana*, respectively. Most other “extraneous names” are examples of the misapplication of the names of extralimital taxa or the listing of two or more synonyms for a single taxon.

Stripped of these additional “false positives” Garnier (1881b, 1882b) did fairly well at building the first list of Ontario amphibians and reptiles. He listed eleven chelonians, which included all of the nine taxa currently known for Ontario except *Chrysemys picta belli* (see footnote 6). Two of the three lizards he recorded were extralimital, but he did list the one species present in Ontario, *Plestiodon fasciatus*.

Garnier listed 28 species and varieties of snakes, whereas only 18 taxa (16 full species) are or historically were present. Eleven of his snakes were *Eutainia* [sic, *Eutaenia*] (= *Thamnophis*), a genus actually represented in Ontario by four taxa, only three of which, *T. s. sirtalis*, *T. s. parietalis* and *T. saurita*, were

known at the time. All were included in his list but *T. s. parietalis* occurs only north and west of the area known to Garnier, and based on the locality he cited, he actually applied this name to specimens of the nominotypical form. Rowell (2012) hypothesized that Garnier’s record of *T. radix*, an extralimital species, was actually the first Ontario record of the similar *T. butleri* (Cope, 1889), a species not yet described. Choquette (2011) confirmed this, verifying that USNM [U.S.

National Museum of Natural History] 10532, a "*T. radix*" from Mitchell's Bay sent to the Smithsonian by Garnier was, in fact, *T. butleri*. Garnier accounted for nearly all of other snakes known from the province, although *Regina septemvittata* was misidentified as the extralimital *Liodytes rigida* and the snake he thought was *Coluber constrictor* was actually *Pantherophis alleghaniensis spiloides*, a taxon he added to his list in 1882. The only other omission was *Nerodia sipedon insularum* (Conant and Clay, 1937), which would not be described for more than half a century.

For frogs, Garnier's 16 entries in 1881 account for nine of the province's 13 species, with a tenth, *Pseudacris triseriata* added in 1882. Two of the missing species had not yet been described: *Anaxyrus fowleri* (Hinckley, 1882) and the now extirpated *Acris blanchardi* (Harper, 1947), and the third, *Pseudacris maculata*, is known only from the northwest of the province (north of approximately 48° N). A glance at Garnier's (1881b) list suggests that he omitted *Aquarana septentrionalis*, the Mink Frog, but it is there under *Pelobates Americanus*, a name introduced in this paper and otherwise absent from the systematic literature. However, Garnier stated that this was "same as *R. circulosa*, &c. Hoosier Frog" (a synonym and common name, respectively, of *Lithobates areolatus*, which Garnier mistakenly regarded as synonymous with *A. septentrionalis*; see Garnier 1883).

Garnier's performance for salamanders was the poorest of all groups, with only five of 13 taxa¹¹ identified in his 1881 and 1882 papers. Those he did not find include one subspecies that was both undescribed in Garnier's time and restricted to the part of the province with which he was unfamiliar, *Notophthalmus viridescens louisianensis* (Wolterstorff, 1914), three species with extremely limited distributions in the province (*Desmognathus fuscus*, *D. ochrophaeus* and *Ambystoma texanum*), the last two of which were not recorded in Ontario until 1985 and 2004, respectively (Bogart et al. 1985; COSEWIC 2018), and

¹¹ The current species total does not include unnamed unisexual lineages of *Ambystoma* (see ORAA 2023), but it does include *Ambystoma tigrinum*, although the few records of the species (1915, 1950 and 1972), all from Point Pelee, are considered suspect (Ngo et al. 2009) and the species is now considered extirpated, if it indeed was ever autochthonous to Ontario. Although not enumerated by Garnier in his published lists, the manuscript catalogue of his collection included one *A. conspersum* (syn. *Ambystoma tigrinum*) from Kintail, Huron County, 230 airline km from Point Pelee, collected in 1889, but it is certain that this was another ambystomatid.

THE CANADIAN SPORTSMAN AND NATURALIST.

37

Herpetology.

LIST OF REPTILIA OF ONTARIO.

To Reptiles that I have not seen, or those reported to me on good authority, I have affixed a mark of interrogation (?). All the others I have recognized, and they are in my cabinet. I do not consider this list by any means perfect, and other forms will doubtless be added by scientific research. I solicit exchange from Herpetologists in the Dominion, and neighboring States of America, as I have a fine lot of Ontario duplicates in the best condition for this purpose. I wish to obtain reptilia, of all classes, from the Province of Quebec, as the difference of climate is of great importance in regard to colouration. This is remarkable in the genus *Eutania*; whose geographical distribution, with other causes, seem to exert an extraordinary influence in regard to tintings and colouration, not alone in Canada, but wherever they occur. There is, perhaps, no branch of natural history less studied in a scientific manner than Herpetology. Here we have an enormous field for research, and scientific enquiry, and Ontario seems as rich in species and genera as any other country of similar extent.

I.—TESTUDINATA.

Family EMYDIDÆ.

- 1—*Chelopus insculptus*. Wood Tortoise. Common.
- 2—*Nanemys gutatus*. Speckled Tortoise. Common.
- 3—*Emys meleagris*. Blanding's Tortoise. Very rare. One specimen captured on Lake St. Clair, by Mr. Buck. Now in my cabinet.
- 4—*Chrysemys picta*. Painted Turtle. Common along the southern shore of Lake Ontario, and in every pond to the south. The most handsome turtle.
- 5—*P. var. marginata*. I have a variety that approaches that described by Jordan.
- 6—*Malacoclemmys geographicus*. Map Turtle.

- 7—*M. pseudo-geographicus*. This is merely a variety, noticeable in the carapace, and seems to be a distinction without a difference.
- 8—*Aromochelys odoratus*. Musk Turtle. Stink pot; found in Lakes Erie, and St. Clair; rare.
- 9—*Chelydra serpentina*. Snapping Turtle. Found throughout Ontario. Used for making soup, and in some localities much sought after for this purpose.
- 10—*Aspionectes spinifer*. Common Soft-shell Turtle. Lakes Erie and St. Clair, scarce; sometimes taken on hooks. Considered a delicacy. One was taken some years ago, in the Ottawa River.—Ed., rare.
- 11—*Amyda mutica* (?) Leathery Turtle. Although I never saw this species, yet there is no doubt that it exists as frequently as the preceding in Lakes Erie and St. Clair.

II.—LACERTILIA.

Family SCINCIDÆ.

- 12—*Eumeces fasciatus*. Blue tailed Skink.
- 13—*E. septentrionalis*. Northern Skink.
- 14—*E. anthracinus*. Coal Skink. I captured these in Tilberry township, Co. Kent. They may be considered the same species; the young being the darkest. Specimens I possess from North Carolina of *E. anthracinus*, and the others are not distinguishable from my specimens from Tilberry.

III.—OPHIDIA.

Family COLUBRIDÆ.

- 15—*Heterodon platyrhinus*, var. *niger*. Hog-nosed Snake. Blowing viper. Puff-adder. Captured near Toronto by Prof. Montgomery. A well marked specimen, though small; also reported near Port Hope and other places.
- 16—*Nerodia sipedon*. Water Snake. Water Adder. Black Water Snake; common.
- 17—*N. erythrogaster*. Red-billed Water-snake. This is a scarce species. Lake St. Clair.
- 18—*N. niger*. Black Water Adder, B. & G. I deem it to be the male of the *sipedon*, and it is now generally rejected as a species.
- 19—*Regina rigida*. Stiff Snake. Rare. Captured by Mr. Buck, at Mud creek, Lake St. Clair.

Fig. 11A. Text of Garnier's "List of Reptilia of Ontario" (1881) on p. 37 of *The Canadian Sportsman and Naturalist*, Vol. 1, No. 5. Collection of author.

Ambystoma tigrinum, known from two doubtful records from Pont Pelee and Pelee Island (Ngo et al. 2009; ORAA 2023). Garnier (1881b) did list a synonym of *Desmognathus fuscus*, but the locality and description provided make it very unlikely that this was the actual species intended. In 1882 Garnier added *Amblystoma Jeffersoni* (= *Ambystoma jeffersonianum*) to the provincial list, but this was almost certainly *A. laterale* based on the locality he provided. Most interestingly, Garnier (1881b) included in his list of salamanders a description of a new species of *Necturus*, which has gone virtually unnoted in the literature (see below).

To evaluate Garnier's effectiveness in documenting the herpetofauna, it is most important to count not the different names he used, but rather the species implied on the basis of his locality records and meager descriptions; in other words, the taxa we can infer from the vantage point of our modern

- 20—*R. leberis* (?) Leather Snake. Reported by several parties, and although I never saw a Canadian specimen, yet it has been identified by Mr. Smith, of Ann Arbor, as being in Michigan. Reports most probably correct.
- 21—*Storeria occipito-maculata*. Red-bellied Snake. Not very rare. Captured in Kent, Bruce and Huron counties, and reported from Owen Sound.
- 22—*S. DeKayi*. Little Brown Snake. Found all over the western portions of Ontario.
- 23—*Eutainia saurita*. Ribbon Snake. I captured one twenty-two inches long in Bruce county; the only Canadian specimen so far examined by me.
- 24—*E. radix*. Hoy's Garter Snake. I captured several young specimens on St. Clair Flats.
- 25—*E. sirtalis*. Garter Snake. This species is considered the typical Garter Snake. I got specimens in Dover township, but never captured it farther north. Not very common.
- 26—*E. dorsalis*. Striped Garter Snake. The best known variety; everywhere abundant. The best marked specimens I have yet seen were procured near Toronto by Mr. W. Brodie.
- 27—*E. ordinata*. A variety with square spots on the sides, seemingly the young of *dorsalis*.
- 28—*E. ordenoides*. } Varieties with more or
29—*E. parietalis*. } less red markings on
30—*E. vagrans*. } the sides. Generally
31—*E. elegans*. } found in marshes or
low lands.
I have captured all sorts of gradings and shadings of coloured specimens around Lake St. Clair. I have also received a few well marked *parietalis* from Mr. John McMillan, Magnetawan, Muskoka.
- 32—*E. Pickeringii*. I have one or two specimens from Mitchell's Bay, Co. Kent, that approach closely to this species or variety, as far as blackness of colour is concerned.
- 33—*E. obscura*. A variety without dorsal stripes. Scarcely admissible even as a variety. The side stripes are generally very obscure.
- 34—*Bascanium constrictor* (?). Black Snake. Gananogue. I have not as yet seen or procured one, but doubtless it exists there among the rocks.
- 35—*Scotophis vulpinus*. Fox Snake. Kent Co. I saw one which measured 7 feet 11 inches, captured by Mr. C. Dusten, and I have one 6 feet 3 inches, taken by Mr. Buck, of Mud creek. Not common. This is the largest and most powerful of our Canadian snakes, at the same time, one of the most innocent, harmless and timid.
- 36—*Cyclophis vernalis*. Grass Snake, Green Snake, Spring or Summer Snake, &c. A well known and beautiful little creature.
- 37—*Diadophis punctatus*. Ring-necked Snake. Not rare in Huron and Bruce counties in damp woods.
- 38—*D. punctatus* var. *amabilis*. I have such a specimen which seems to be the young of the last (*D. punctatus*) and admit it in deference to Mr. Cope, though doubtful of it being worth consideration.
- 39—*Ophibolus doliatius* var. *triangulus*. Milk Snake, Chicken Snake, House Snake, Chain Snake, &c. A well-known species.

Family CROTALIDÆ.

- 40—*Crotalus horridus*. Banded Rattlesnake. Rapidly becoming extinct. I saw one killed on the mountain a few miles east of Hamilton in 1859, and one in 1873, captured not far from Niagara. The measured about three feet each.
- 41—*Crotalophorus tergeminus*. Massasauga. Prairie Rattlesnake. I saw the decaying remains of one in Tilberry marsh. The rattles were gone, but having no means of carriage, had reluctantly to leave it. Not rare formerly along Lake Erie, although now exceedingly scarce.

IV. BATRACHIA.

ANURA (Family Tailless Batrachians)

RANIDÆ.

- 42—*Rana helescina*. Leopard Frog. Everywhere.
- 43—*R. pulustris*. Pickerel or yellow-legged frog. Common.
- 44—*R. clamitans*. Green Frog. Common.
- 45—*R. var. caruleus*. I introduce this as a local variety. I captured several with a deep indigo head, but now changing in alcohol to a dark greenish brown.
- 46—*R. Catesbeyana*. Bull Frog. Common.

Fig. 11B. Text of Garnier's "List of Reptilia of Ontario" (1881) on p. 38 of *The Canadian Sportsman and Naturalist*, Vol. 1, No. 5. Collection of author.

knowledge of the fauna. In all, Garnier (1881b, 1882b) signaled the presence of 39 of the 50 species of amphibians and reptiles recognized as having occurred in Ontario in historical times (Table 1). For reptiles, he recorded 24 of 25 species, missing only *Coluber constrictor* (although the name appeared on his "List"). For amphibians his total was a more modest 15 of 25 species, although as noted above, many of those missed were not discovered or differentiated until much later, and others were from areas far from Garnier's centers of activity in Bruce and Huron counties and near Lake St. Clair. For comparison, Nash (1905, 1908), a quarter century later recognized 27 species of reptiles and 23 amphibians in Ontario, but correcting for misidentifications and synonyms he actually added only one species, *Hemidactylium scutatum*, to Garnier's total. The similarity is not surprising, as Nash used many of Garnier's records, although without citing his

papers. For example, Nash's records for a few species not actually occurring in the province (*Eumeces anthracinus*, *E. septentrionalis*, *Regina rigida*) were derived directly from Garnier.

In Garnier's last published paper, in the Toronto newspaper *The Empire* (Garnier 1894), he made a final adjustment to his tally of the snake of Ontario, increasing the number from 28 to 33. In this work (Fig. 13), he updated some generic assignments and deleted *Regina leberis*, *Nerodia niger*, *Eutainia vagrans*, *E. elegans*, *Diadophis punctatus* var. *amabilis* and *Scophotis Allighaniensis* from his earlier lists (Garnier 1881b, 1882b). However, he also added ten new names (Table 2). Most of these apply to extralimital taxa but their true identities are mostly unambiguous, although a few are more problematic or interesting. He explicitly proposed a new varietal (subspecific?) name for blue-spotted garter snakes, and he suggested the occurrence of the bullsnake in far western Ontario, his only published reference to the herpetofauna of this region of the province.

Two new MUDPUPIES

The last two taxa on Garnier's (1881b) "List" were *Necturus lateralis* (syn. *N. maculosus*) and *N. Huronensis*. While there is ambiguity over Garnier's intentions in proposing new anuran varietal names (see above), it is crystal clear that he intended to name *N. Huronensis* as new: "65 — *N. Huronensis* (Spec. novum). About a foot long; deep sooty-brown on back, lighter on belly. Gills bushy, brown, end of each orifice red, in three rows. Throat white. Vent reddish. Upper jaw hooked over

lower; eyes black, not prominent. I have only obtained two specimens in streams during twenty-five years. Very rare. I venture this as a new species." (Fig. 11). The description unambiguously meets requirements of the *International Code of Zoological Nomenclature* (Anonymous 1999) for names proposed prior to 1931. Nonetheless, although Garnier's list itself has been cited numerous times (although if it was actually seen by most authors is less clear), *N. Huronensis* has never been mentioned in *Necturus*-specific literature such as Bishop (1926), Harris (1954, 1961) or Brode (1969) or in otherwise comprehensive works that list amphibian synonyms including Frost (1985 and subsequent online versions) or Fouquette and Dubois (2014), although many of these sources cited *Menobranchius latastei*, a species he described later (see below). The only subsequent publication to cite *Necturus huronensis* was that of Cox (1907) who says of it

“apart from the color due to local conditions, they possess no structural variation from the specific type sufficient to warrant the recognition of a new species.” Cox’s paper (Fig. 14) itself mostly escaped the notice of later authors as it appeared in another relatively obscure journal, the *Proceedings of Miramichi Natural History Association*, published in New Brunswick in only seven issues between 1899 and 1913.

Cox (1907), effectively synonymized *N. huronensis* with *N. maculosus*, which has an extremely wide distribution across large areas of the eastern United States and Canada. However, Chabarria et al. (2017) demonstrated that there are multiple lineages within *Necturus* that may warrant taxonomic recognition. Most notably, they suggested that the Great Lakes populations of *N. maculosus* might be distinct from typical, more southerly distributed populations, which would include the type locality in the Ohio River, as well as southern populations sometimes treated as *N. louisianensis*. Greenwald et al. (2020), however, found an east-west divergence across the Mississippi River, with typical *N. maculosus* likely including populations in both the Ohio River drainage and the Great Lakes, whereas western lineages they sampled (e.g., Minnesota and Iowa) were substantially divergent and likely related to populations in the Lower Mississippi basin (*N. louisianensis*). Raffaelli (2022) inferred that the few, scattered Ontario records from the north shore of Lake Superior were part of the western lineage. This interpretation would add an additional subspecific taxon to the provincial herpetofaunal list (ORAA 2023), but as Garnier’s type locality, although unstated, was clearly from Lake Huron (likely near his home in Bruce County), this would place it rather centrally in the distribution of *N. maculosus sensu stricto*. Were, however, Chabarria et al.’s (2017) results to be validated (sampling in the critical Ohio River Valley region has been limited to date) the Great Lakes populations would require a new name. In this instance *Proteus canadensis* Hodgkins, 1856, from the “Bay of Toronto, Lake Ontario” would have priority over *N. huronensis*, so under either scenario Garnier’s name would be a junior synonym.

A third Ontario *Necturus* type locality is that of *Menobanchus latastei*, described by Garnier (1888a) from the Maitland River and treated by Cope in Garnier (1888a) as *N. lateralis* var. *Latastei*. Garnier contrasted this form with the “ordinary form” that he had examined from the Don River (Toronto) and Lake St. Clair. Although two USNM specimens sent by Garnier to Cope (Cochran 1961; Fig. 15) seem

to be the only extant material from the type series, Garnier’s catalogue of his collection indicates that he subsequently assigned material from London (1881) and Lucknow (1883 and 1887) to this form, whereas specimens from the Lake St. Clair area were considered *M. lateralis* (*N. maculosus*). The catalogue makes no mention of *N. huronensis*. The Maitland River empties into Lake Huron at Goderich, Huron County, 29 km SSW of Lucknow and the question arises if Garnier (1888a) erected *M. latastei* as a replacement name for *N. huronensis*. If so, the surviving syntypes of former might be the same two specimens mentioned in the description of the latter, making *M. latastei* an objective junior synonym of *N. huronensis*.

THE CANADIAN SPORTSMAN AND NATURALIST.

39

47—*R. var. rufus*. I introduce this as it is a larger variety; copper brown with no trace of green on the body or head; has a hoarser voice, and keeps more in deep marshes. I obtained specimens on St. Clair Flats and in Bruce county. This variety is well marked.

48—*R. sylvatica*. Wood Frog. I emphatically deny that this species has any connection with the European *R. temporaria* and it is not a variety but a totally distinct species. On comparing it with European specimens in my Cabinet there is nothing whatever in common, and their life history is entirely different.

49—*R. sylvatica* var. *Cantabrigensis*. Specimens I have from Massachusetts, Michigan, &c., differ little from Canadian. Rare.

50—*Pelobates Americanus*. The same as *R. circulosa*, &c. Hoosier Frog. It is not a true Rana, nor can I admit it as such at present.

51—*Hyla versicolor*. Common Tree-toad. Common. South. Disappearing gradually northward.

52—*H. Andersonii*. I have found half-grown, and nearly adult *H. versicolor*, almost pure green, with a chocolate brown band obscuring the eye. Generally found among green herbage, and difficult to observe.

53—*H. Pickeringii*. Pickering’s Tree-toad. One of the earliest frogs to croak.

54—*Acris Gryllus* var. *crepitans*. Cricket Frog. The most noisy of frogs for its size. Common.

55—*A. gryllus* var. *gryllus*. A variety here of which I have two specimens I can only relegate to this. Taken near Lucknow, Co. Bruce, May 23, 1879.

56—*Bufo lentiginosus* var. *Americanus*. Toad. Common. Very useful to destroy caterpillars and insects.

57—*B. lentiginosus* var. *niger*. I have a deep black coloured variety. Young generally blacker.

URODELA—(Tailed Batrachians).

PLEURODELIDÆ.

58—*Diemyctylus viridescens*. Spotted Triton. Newt, &c. Common.

59—*D. mineatus*. Red Eft. Scarce.

60—*Desmognatus niger*. Black Salamander. Captured and presented to me by Mr. Brodie, Toronto.

61—*Plethodon erythronotus*. Red-backed Salamander. Common.

62—*P. var. cinereus*. Not very rare.

Family AMBLYSTOMIDÆ.

63—*Amblystoma punctatum*. Large Salamander. Common.

PROTEIDA.

64—*Necturus lateralis*; *menobanchus* (Baird), Mud Puppy. Taken by me in Lakes St. Clair, Huron, and Erie, and near Toronto; not very rare in the Don River.

65—*N. Huronensis* (Spec. novum). About a foot long; deep sooty-brown on back, lighter on belly. Gills bushy, brown, end of each orifice red, in three rows. Throat white. Vent reddish. Upper jaw hooked over lower; eyes black, not prominent. I have only obtained two specimens in streams during twenty-five years. Very rare. I venture this as a new species.

I trust to find time to send a history of the English frog, *Rana temporaria* in an early issue of the CANADIAN SPORTSMAN AND NATURALIST, and to demonstrate clearly peculiarities completely at variance with the form of *R. sylvatica*, which I think will prove their total specific difference. Any gentleman who may have a reptile of which he does not know the name, would confer a great favor by sending it in a box by mail, and after examination, I will return it with thanks. By this means, perhaps, new species, or varieties may be discovered in the Dominion.

JOHN H. GARNIER, M.D.

Lucknow, Bruce Co., O.

PROTECTION OF GAME.

The following address is from the pen of Dr. E. S. Holmes, President of the Michigan Sportsman’s Association:—

“It has been asserted that Sportsmen’s Associations are purely selfish; that the object of

Fig. 11C. Text of Garnier’s “List of Reptilia of Ontario” (1881) on p. 39 of *The Canadian Sportsman and Naturalist*, Vol. 1, No. 5. Collection of author.

Table 2. Taxa added to the Ontario snake fauna by Garnier (1894) in “The Snakes of Ontario” published in *The Empire* (see also Fig. 13). These nomina had not appeared in his earlier lists (Garnier 1881b, 1882b). Garnier’s names are given verbatim (including question marks, when present), with my additions in square brackets ([]). Current Name is the name corresponding to Garnier’s name and does not necessarily reflect the actual identity of taxon referred to. The right-hand column gives the likely identity of the taxon as well as other remarks.

Garnier (1894) name	Current Name	Probable Identity; Remarks
<i>Caudisona miliaria</i>	<i>Sistrurus miliarius</i>	<i>Sistrurus catenatus</i> ; <i>S. miliarius</i> is extralimital.
<i>Heterodon</i> var. <i>simus</i>	<i>Heterodon simus</i>	<i>Heterodon platirhinos</i> ; <i>H. simus</i> is extralimital.
<i>Tropidonotus</i> [<i>Sipedon</i>] var. <i>Woodhousei</i>	<i>Nerodia erythrogaster</i>	<i>Nerodia sipedon</i> (see footnote 7, Table 1)
<i>Eutænia</i> [<i>sirtalis</i> ?] var. <i>Hopleyi</i> (var. nov.) ¹²	nomen nudum	<i>Thamnophis s. sirtalis</i>
<i>Eutænia Concinna</i>	<i>Thamnophis sirtalis concinnus</i>	<i>Thamnophis s. sirtalis</i> ; <i>T. s. concinnus</i> is extralimital
<i>Eutænia</i> approaching <i>Faireyi</i>	<i>Thamnophis proximus</i>	<i>Thamnophis s. sirtalis</i> ; <i>T. proximus</i> is extralimital
<i>Eutænia Sirtalis</i> var. <i>Marciana</i>	<i>Thamnophis marcianus</i>	<i>Thamnophis s. sirtalis</i> ; <i>T. marcianus</i> is extralimital
<i>Coluber obsoletus</i>	<i>Pantherophis obsoletus</i>	<i>Pantherophis alleghaniensis spiloides</i> ; <i>P. obsoletus</i> is extralimital
<i>Ophiobolus doliatus</i>	<i>Cemophora coccinea</i>	<i>Lampropeltis triangulum</i> ? ¹³ ; <i>Cemophora coccinea</i> is extralimital
<i>Pityophis Melanolencas</i> [sic]	<i>Pituophis melanoleucas</i>	<i>Pituophis catenifer sayi</i> ? ¹⁴ (extralimital)

¹² Garnier was explicit that he considered this to be a new variety. Presumably this was intended to be a subspecies of *Eutænia sirtalis*. As in his initial list of 1881, Garnier often omitted the specific epithet when giving varieties. It was distinguished by being blue spotted and was recorded from Middlesex County, the area surrounding London, Ontario. It clearly applies to a color morph of nominotypical *Thamnophis sirtalis*. The name, incorrectly formed in the masculine genitive, was certainly meant to honor Catherine Cooper Hopley (1817–1911), who was an expert on and popularizer of snakes (Adler 2007) and likely had come to Garnier’s attention through the publication of her book *Snakes: Curiosities & Wonders of Serpent Life* (1882).

¹³ This species was described by Garnier (1894) as a “corn snake” but *Ophiobolus doliatus* is in the synonymy of *Cemophora coccinea*, the scarlet snake. *Lampropeltis triangulum* may have been the species intended, but Garnier was familiar with this species, and it is possible that a juvenile *Pantherophis* sp. May have been the source of these records.

¹⁴ Garnier stated of this species “bullsnake, west of lake of the Woods (rare).” Lake of the Woods lies in the far west of Ontario at its junction with Manitoba and Minnesota and this is the only mention in any of his writings of a reptile or amphibian from this region. The bullsnake, *Pituophis catenifer sayi*, is not known from Ontario, nor has it been recorded in Manitoba. However, there is an isolated population in northwestern Minnesota, with records from Marshall County, approximately 100 km WSW of Lake of the Woods (Moriarty and Hall 2014). Knowledge of this population may be the source of Garnier’s listing of the bullsnake. Regardless, “west of Lake of the Woods” would have placed the species outside the bounds of Ontario, but perhaps Garnier thought it was likely to be found eventually.

IMPACT OF GARNIER’S HERPETOLOGICAL WORK

Garnier’s work, perhaps other than that on the Mink Frog (Garnier 1883), went largely under-appreciated in the wider scientific community. Only this work and his two papers in the *Proceedings of the Canadian Institute* were listed in the *Royal Society Catalogue of Scientific Publications*, and only his paper on “Snake poisons” in the latter journal was indexed in *Zoological Record*. His “List” (Garnier 1881b) was not cited by Piersol (1913) or Williams (1913), nor by Logier (1937, 1939, 1952), some of the standard early works on Ontario. Cox (1907), the only author ever to acknowledge the name *Necturus huronensis*, however cited Garnier’s (1881b) locality records for various salamanders and Nash (1905, 1908) credited him with localities for several reptile species, although without actually citing the paper. Garnier (1881b) was also cited by Wright and Wright (1942) in the second edition of the *Handbook of Frogs and Toads*. Apparently from this citation it was included in references (although not actu-

ally cited) by Bishop (1943), Carr (1952), Wright and Wright (1962) in the *Salamanders, Turtles and Snakes*, respectively, in the same Comstock Handbook series, and by Logier and Toner (1955, 1961) in their checklists of the herpetofauna of Canada and Alaska. In more recent literature, it was cited by Cook (2007), Rowell (2012) and in the *Ontario Reptile and Amphibian Atlas* (ORAA 2023).

Garnier’s paper describing *Menobranchus latastei* was more often cited. Interestingly, Cope (1889) did not mention *M. latastei* by name or include it in his synonymy of *Necturus maculosus*, but he did state (p. 26) “An entirely black variety has been sent me by Dr. J. G. [sic] Garnier of Lucknow, Ontario, which he has obtained from the Maitland and Lucknow Rivers.” This might imply that Cope was not aware that Garnier’s (1883) description (and his own suggestion that it might be considered a subspecies of *N. maculosus*) had actually been published. This paper was, however, cited by Piersol (1913), Bishop (1926, 1947), Schmidt (1953) in the 6th and final edition of *Check List of North American Amphibians and Rep-*

tiles, and by Harris (1954, 1961). Bishop (1926) mentioned *M. latastei* (as *N. latastei*), but did not accord it any taxonomic rank, although he noted that specimens he examined from Pointe au Baril on Georgian Bay were similar to Garnier's. Cochran (1961) cited two syntypes, USNM 22331–32, apparently the same specimens sent to Cope for his opinion. Frost (2025) has likewise cited Garnier in this context.

Garnier's (1881b) brief comments on the two species of rattlesnake in Ontario have been cited several times in discussions of the decline of *Sistrurus catenatus* and the extirpation of *Crotalus horridus* (Cook 2007; Rowell 2012). His published record for the former was from Tilberry (presumably Tilbury) Marsh, and his archived collection catalogue lists specimens obtained from Washago in 1881 and Stokes Bay, Bruce County in 1885. Although Stokes Bay is still inhabited by massasaugas, there are no recent records from Washago or Tilbury (ORAA 2023). Garnier (1881b) stated that they were "not rare formerly along Lake Erie, although now exceedingly rare." For *Crotalus horridus* Garnier noted a specimen that he himself collected from "vic. Niagara Falls" in 1877 and in his "List" he mentioned specimens reported "on the mountain [the Niagara Escarpment] a few miles east of Hamilton" in 1859 and one collected "not far from Niagara" in 1873 (possibly the same as the 1877 record, with the date a *lapsus*). Garnier (1881b) stated that they were "rapidly becoming extinct." As early as 1930, *Crotalus* was considered to be extirpated in Ontario (LeRay 1930). Toner (1958), however, recorded then recent (but undated) records from Niagara Glen and Point Pelee as well as older records from Fitzwilliam Island and Dundas (the former vouchered). The species is now considered to have been extirpated from Ontario by 1941, although there are unverified records up to about 1960 (Rowell 2012; ORAA 2023). The historical importance of Garnier's work on snakes has been discussed at some length in *The Snakes of Ontario* (Rowell 2012).

CONCLUSIONS

John Hutchison Garnier was an interesting figure in the early history of Canadian herpetology. He was an autodidact whose reputation, at least during his lifetime, was disproportionate to his small publication output. As one of few naturalists at the edge of the settled areas of Ontario in the middle 19th century, he supplied the needs of others by providing specimens and natural history observations to zoologists around the world while assembling a large private museum collection. His network of correspondents brought him into contact with leading herpetologists of the day, but he was left to his own devices to interpret the literature he received from them. His local fame probably stemmed as much from his cantankerousness and erratic behavior as it did from his scientific contributions (Mackenzie 1927; Johnston 1933a, 1933b; Roland 1990).

Garnier was recognized as an expert on amphibians and reptiles, but this reputation was greater than his meager pub-

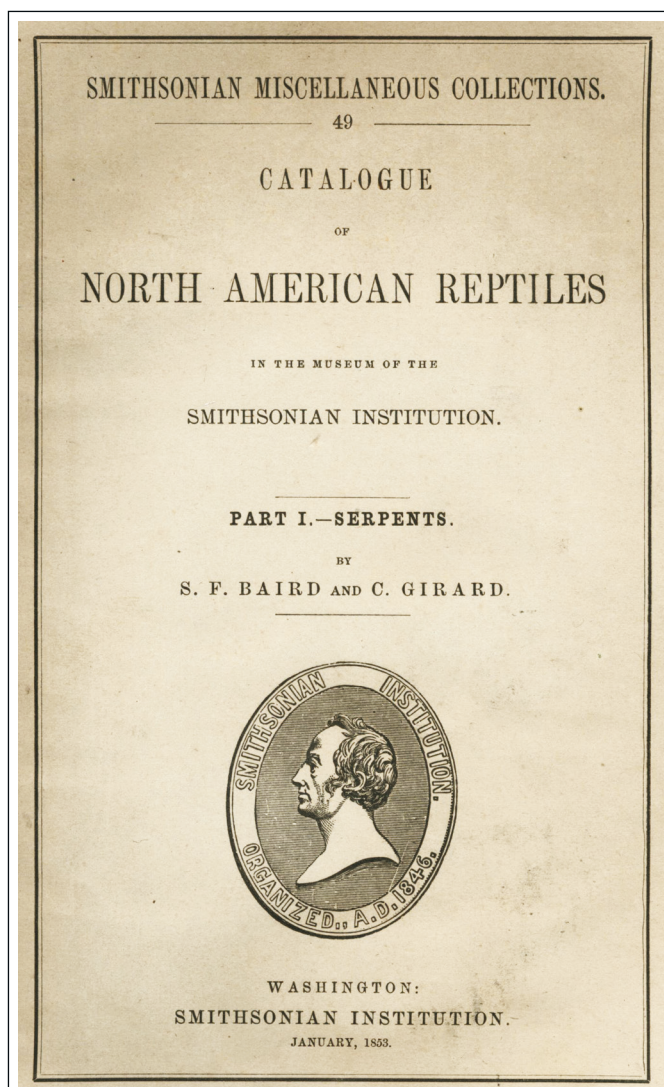


Fig. 12. Cover of Baird and Girard (1853) *Catalogue of North American reptiles in the Museum of the Smithsonian Institution. Part I. – Serpents*, Garnier's main source for his naming of Ontario snakes. Collection of author.

lication record warranted and rested chiefly on his being one of the only people in Ontario at the time with an interest in the subject. His publications are of interest for precisely this reason. His "List of Reptilia of Ontario" was the first attempt to compile a provincewide herpetological inventory. By dint of this, he established a place in the history of Canadian herpetology (Cook 2007; Rowell 2012). Although his list was rife with errors, it was impressive in that he recognized 39 of the now recognized 50 species of Ontario amphibians and reptiles, recording (albeit often under the wrong names) the majority of species in the parts of the province that were known to him.

Garnier's works are also of interest because he proposed new nomina in three of his papers. *Menobanchus Latastei* achieved some recognition and, although it was quickly synonymized with *Necturus maculosus*, it lives on in the synony-

—◆—

The Snakes of Ontario.
To the Editor of The Empire.

Sir.—Having had my attention drawn by a friend to a list of the snakes of Ontario that appeared a short time ago in your paper, I have been requested to send a list of those I have been able to identify, and ask for a small space, if convenient, in your paper. I give the scientific and English names and the locality whence they have been secured and sent me :

CROTALIDÆ—RATTLE SNAKES.

1. *Crotalus Horridus*, banded rattlesnake, near Niagara.
2. *Caudisoma Miliaria*, prairie rattlesnake, Essex county.
3. *Caudisoma Tergemina*, Massasauga, Bruce county, north, etc.

COLUBRIDÆ—HARMLESS SNAKES.

4. *Heterodon Platychinus*, hog nosed snake, county Kent, etc.
5. *Heterodon* var. *Simus*, blow adder (rare), county Elgin.
6. *Tropidonotus Sipedon*, water snake, all over.
7. *Tropidonotus* var. *Erythrogaster*, lake St. Clair.
8. *Tropidonotus* var. *Woodhousei*, Point Pelee, lake Erie.
9. *Tropidonotus Rigidus*, stiff snake, Mitchell's bay, lake St. Clair.
10. *Storeria Dekayi*, DeKay's snake, from Bruce county, all over.
11. *Storeria Occipito Maculatus*, red bellied snake, Bruce county, all over.
12. *Eutænia Saurita*, riband snake, in marshes, all over.
13. *Eutænia Sirtalis*, garter snake, common, all over.
14. *Eutænia*, var. *Radix*, Hoy's garter snake, Kent county, Manitoba, near Sault St. Marie, environs, London, Ont., Point Pelee, etc.

14. *Eutænia*, var. *Radix*, Hoy's garter snake, Kent county, Manitoba, near Sault St. Marie, environs, London, Ont., Point Pelee, etc.

15. *Eutænia*, var. *Ordinata*, lake St. Clair flats.

16. *Eutænia*, var. *Doralis*, Huron, Bruce and in northern woods.

17. *Eutænia*, var. *Parietalis*, Wallaceburg and Essex county.

18. *Eutænia*, var. *Obscura*, Mitchell's bay and Elgin county.

19. *Eutænia*, var. *Hopleyi* (var. nov.), blue spotted, Middlesex county.

20. *Eutænia*, var. *Ordenoides*, Lambton and south.

23. *Eutænia*, var. *Conciuna* (rare), crimson and black, Tilbury marsh.

24. *Eutænia*, var. *approaching Faireyi*, near Chatham.

25. *Bascanion Constrictor*, black snake, borders of New York state, P.Q.

26. *Pityophis Melanoleucas*, bull snake, west of lake of the Woods (rare).

27. *Coluber Obsoletus*, pilot racer, reported south of Windsor, Essex county.

28. *Coluber Vipinus*, fox snake, Kent, Essex, Lambton, etc.

29. *Cyclophis Vernalis*, grass snake (scarce), all over.

30. *Diadophis Punctatus*, ring neck snake, Bruce and other counties.

31. *Ophibolus Doliatus*, corn snake (a rare form), Essex and Elgin counties.

32. *Ophibolus* var. *Triangulus*, milk snake, all over.

33. *Eutænia Sirtalis* var. *Marciana*, Kent and Elgin counties.

Likely other forms may be obtained, as the study of herpetology has been much neglected by the naturalists of this province and the Dominion.

J. H. GARNIER, M.D.
Lucknow, September 25.

—◆—

Fig. 13. Garnier's last herpetological publication, "The snakes of Ontario" from p. 16 of *The Empire* of 6 October 1894. From microfilm copy at the University of Toronto Library System.

my of that species. His other new names, however, have fallen into almost total obscurity. In part this is because their associated descriptions were short, superficial and poorly executed, but maybe more so because they were published in a short-lived, regional journal (*The Canadian Sportsman and Naturalist*) and in a newspaper (*The Empire*). Only one of these, *Necturus Huronensis* Garnier, 1881, was explicitly proposed as a new species and provided some descriptive text. The others include a replacement name for the mink frog (*Pelobates*

Americanus) and the proposal of four new varieties of snakes and frogs, each distinguished on the basis of color and leaving open the possibility that Garnier's use of "variety" may not have been intended to have taxonomic significance. Regardless, in none of these instances do any of Garnier's names pose a threat to established nomenclature. They are, however, a bibliographic anomaly as they appear, with one exception for *N. Huronensis* (Cox 1907), to never have been noted in the literature. The "rediscovery" of such lost nomina can, howev-

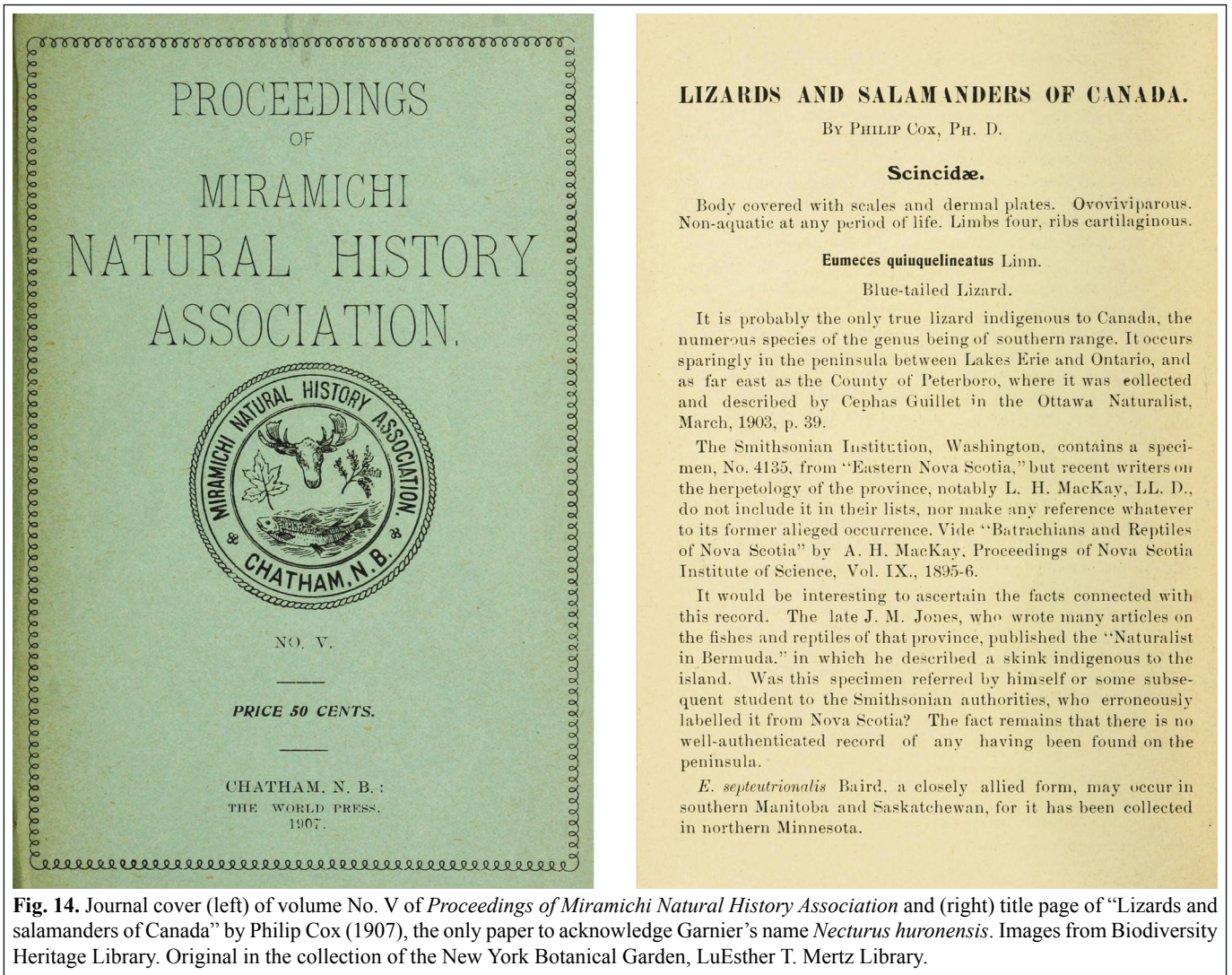


Fig. 14. Journal cover (left) of volume No. V of *Proceedings of Miramichi Natural History Association* and (right) title page of “Lizards and salamanders of Canada” by Philip Cox (1907), the only paper to acknowledge Garnier’s name *Necturus huronensis*. Images from Biodiversity Heritage Library. Original in the collection of the New York Botanical Garden, LuEsther T. Mertz Library.

er, have nomenclatural implications (e.g. Frétey and Raffaëlli 2021) and they deserve to be investigated.

At the time of his death, Garnier had been working on a book-length manuscript, still extant, on the herpetofauna of Ontario. But even had it been published, it would have been unlikely to have sealed his herpetological legacy. By the end of the 19th century, herpetology, like zoology in general, was becoming a more “professional” field, based at universities and museums. Garnier’s knowledge, gathered mostly in isolation and without the benefit of the critical interaction of colleagues or the ready access to literature and professionally curated collections, would have been outdated.

Garnier’s own large collections were once touted as “the most complete in the land” (Mackenzie 1927). A large number of his specimens are still extant in the Royal Ontario Museum and a smaller number are in the Smithsonian Institution. It is likely that some of his exchanged specimens are also still present in collections in Europe, India and Australia. Unfortunately, the majority of these represent exotic specimens, obtained — often with minimal data — from his cor-

respondents. His surviving Ontario material is limited to just 12 confirmed specimens in the R.O.M. and 38 in the Smithsonian, only a few of which can be matched to his preserved collection catalogue or his published records.

Garnier’s tangible impacts on his various fields of accomplishment — herpetology, ornithology, medicine and even playwriting, must unfortunately be regarded as negligible. However, as one of the pioneering naturalists in Ontario, his contributions, mostly long forgotten, paved the way for everything that came after, and it is hoped that this retrospective of his life and works will contribute to recovering his place in the history of Canadian herpetology.

ACKNOWLEDGEMENTS

I thank Amy Lathrop, Charlotte Chaffey and Irene Wu of the Royal Ontario Museum for providing current records and archival material relating to Garnier’s herpetological collections and for locating obituaries of Garnier from Toronto newspapers. Jeff Rowell kindly provided the image of Gar-



Fig. 15. Syntype of *Menobranthus latastei* (syn. *Necturus maculosus*), USNM 22332, dorsal view. Public Domain. Creator: James A. Poindexter II. Image used under Creative Commons Zero (CC0) license.

nier in old age. Margot Accettura, Falvey Library, Villanova University went above and beyond to obtain a scan of Garner's 1894 paper in *The Empire*. The paper benefitted from the constructive comments of Amy Lathrop and an anonymous reviewer.

REFERENCES

- Adler, K. 2007. Herpetologists of the past. Part 2. Pp. 7–273 in: K. Adler (ed.), *Contributions to the History of Herpetology, Volume 2*. Society for the Study of Amphibians and Reptiles, Saint Louis, Missouri.
- Anonymous. 1898a. Dr. Garnier dead. *The Evening Star* [Toronto], February 5, 1898, p. 1.
- Anonymous. 1898b. A Canadian scientist's death. *The Globe* [Toronto], March 5, 1898, p. 3.
- Anonymous. 1898c. Personal paragraphs. *New Zealand Graphic*, 29 October 1898:564.
- Anonymous. 1918. *Dramatic Compositions Copyrighted in the United States 1870 to 1916*. Volume 1. A to N. Library of Congress, Copyright Office, Washington, D.C. [2] + v + 1662 pp.
- Anonymous [International Commission on Zoological Nomenclature]. 1962. Opinion 632. *Regina Baird & Girard, 1853* (Reptilia): designation of a type-species under the plenary powers. *The Bulletin of Zoological Nomenclature* 19(3):145–147.
- Anonymous [International Commission on Zoological Nomenclature]. 1999. *International Code of Zoological Nomenclature*, Fourth edition. International Trust for Zoological Nomenclature, London. xxix + 306 pp.
- Baird, S. F. and Girard, C. 1853. *Catalogue of North American reptiles in the Museum of the Smithsonian Institution*. Part I. – *Serpents*. Smithsonian Institution, Washington, D.C. xvi + 172 pp.
- Bishop, S. C. 1926. Notes on the habits and development of the Mudpuppy, *Necturus maculosus* (Rafinesque). *New York State Museum Bulletin* No. 268: 5–60, pls. 1–11.
- Bishop, S. C. 1943. *Handbook of Salamanders; the Salamanders of the United States, of Canada, and of Lower California*. Ithaca, New York: Comstock Publishing Company. xiv + 555 pp., frontispiece.
- Bleakney, J. S. 1958. A zoogeographical study of the amphibians and reptiles of eastern Canada. *National Museum of Canada Bulletin* No. 155. [iv] + 119 pp.
- Bogart, J. P., Licht, L.E., Oldham, M.J. and Darbyshire, S.J. 1985. Electrophoretic identification of *Ambystoma laterale* and *Ambystoma texanum* as well as their diploid and polyploid interspecific hybrids (Amphibia: Caudata) on Pelee Island, Ontario. *Canadian Journal of Zoology* 63:340–347.
- Brode, W. E. 1969. A systematic study of salamanders of the genus *Necturus*, Rafinesque. Doctoral dissertation, University of Southern Mississippi. [i] + 137 pp.
- Brunton, D. F. 2004. Origins and history of the Ottawa Field Naturalists' Club. *The Canadian Field-Naturalist* 118:1–38.
- Carr, A. 1952. *Handbook of Turtles. The Turtles of the United States, Canada, and Baja California*. Comstock Publishing Associates, Ithaca, NY. xv + 542 pp.
- Caswell, E. S. 1936. An eccentric physician. *Canadian Journal of Medicine and Surgery* 79:135–138.
- Chabarria, R. E., Murray, C. M., Moler, P. E., Bart, H. L., Jr., Crother, B. I. and Guyer, C. 2018. Evolutionary insights into the North

- American *Necturus beyeri* complex (Amphibia: Caudata) based on molecular genetic and morphological analyses. *Journal of Zoological Systematics* 56:352–363.
- Chamberlain, M. 1887. *A Catalogue of Canadian Birds, with Notes on the Distribution of the Species*. J. & A. McMillan, Saint John, New Brunswick. [4] + v + [1] + 143 pp.
- Choquette, J. 2011. A review of historic and unverified Butler's Gartersnake locations in southern Ontario. *The Canadian Herpetologist* 1(2):9–11.
- Cochran, D. M. 1961. Type specimens of reptiles and amphibians in the U.S. National Museum. *Bulletin of the United States National Museum* 220: xv + 289.
- Cook, F. R. 2007. Canadian reptile studies: Anecdote to inventory. Pp. 5–22 in Seburn, C.N.L. and Bishop, C.A., eds. *Ecology, Conservation, and Status of Reptiles in Canada*. Society for the Study of Amphibians and Reptiles, Salt Lake City, Utah [Herpetological Conservation, Number Two].
- Cope, E. D. 1889. Batrachia of North America. *Bulletin of the United States National Museum* 34: 5–525, pls. I–LXXXVI.
- COSEWIC. 2018. COSEWIC assessment and status report on the Allegheny Mountain Dusky Salamander (*Desmognathus ochrophaeus*) Appalachian population, Carolinian population in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa.
- COSEWIC. 2021. COSEWIC assessment and status report on the Eastern Hog-nosed Snake (*Heterodon platirhinos*) in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa. xi + 45 pp.
- Cox, P. 1907. Lizards and salamanders of Canada. *Proceedings of Miramichi Natural History Association* 5:46–55.
- DeKay, J. 1842. *Zoology of New York, Part III: Reptiles and Fishes; Part IV. Fishes*. State of New York, Albany. (2 volumes) vii + 98 pp + xvi + 415 pp + 23 plates + 79 pls.
- Dodd, C. K., Jr. 2022. Bibliography of the Anurans of the United States and Canada. Part 1: 1698–2012. Part 2: 2013–2021. *Wahlgreniana* 2. x + 282 pp.
- Dymond, J.R. 1940. History of the Royal Ontario Museum of Zoology. *Contributions of the Royal Ontario Museum of Zoology* No. 18. 52 pp., frontispiece.
- Fouquette, M. J., Jr., and A. Dubois. 2014. *A Checklist of North American Amphibians and Reptiles. Seventh Edition. Volume 1—Amphibians*. XLibris (print-on-demand), Bloomington, Indiana. 613 pp.
- Frétey, T., and J. Raffaëlli. 2021. Barton and the forgotten description of *Salamandra horrida* (Amphibia, Urodela): story of a rediscovery. *Bionomina* 25:35–51.
- Frost, D. R. 1985. *Amphibian Species of the World. A taxonomic and Geographical Reference*. Association of Systematics Collections and Allen Press, Lawrence. v + 732 pp.
- Frost, D. R. 2025. *Amphibian Species of the World: An Online Reference*. Version 6.2 (accessed 8 March 2025). Electronic Database accessible at <https://amphibiansoftheworld.amnh.org/index.php>. American Museum of Natural History, New York.
- Gage, S. H. 1891. Life-history of the vermilion-spotted newt (*Diemyctylus viridescens* Raf.). *The American Naturalist* 25:1084–1110.
- Garner, J. H. 1871. Over-distention of the uterus from excess of liquor amnii. *Canada Lancet* 3:262–266.
- Garnier, J. H. 1877. *Prince Pedro: A Tragedy*. Belford Brothers, Toronto. Vii + 158 pp.
- Garnier, J. H. 1881a. The Robin — *Turdus migratorius*. *The Canadian Sportsman and Naturalist* 1(5):35.
- Garnier, J. H. 1881b. List of Reptilia of Ontario. *The Canadian Sportsman and Naturalist* 1(5):37–39.
- Garnier, J. H. 1881c. Deer's horns — a royal head. *The Canadian Sportsman and Naturalist* 1(7):54–55. [in a P.S., Garnier defends his 1881a argument (that robins make a tasty treat) against another reader].
- Garnier, J. H. 1881d. Robins again. *The Canadian Sportsman and Naturalist* 1(10):78–79.
- Garnier, J. H. 1882a. The Red Crossbill. *The Canadian Sportsman and Naturalist* 2(2):111–112.
- Garnier, J. H. 1882b. Notes on the natural history of Lucknow, Ont. *The Canadian Sportsman and Naturalist* 2(4):125–126.
- Garnier, J. H. 1882c. Pickering's tree frog (*Hyla Pickeringii*). *The Canadian Sportsman and Naturalist* 2(6):144–146.
- Garnier, J.H. 1882d. *Lynx rufus* — The Red Lynx. *The Canadian Sportsman and Naturalist* 2(8):160–162.
- Garnier, J.H. 1883. The mink or Hoosier frog. *The American Naturalist* 17:945–954.
- Garnier, J.H. 1884. *Candisoma edwardsii*, a new Canadian rattlesnake. *Canadian Science Monthly* 2(5/6):73–75.
- [Garnier, J.H.] 1888a. Synopsis of a paper read before the Biological Section by Dr. Garnier on a new species of *Menobranchus*. *Proceedings of the Canadian Institute, Toronto*. Ser. 3, 5 [1886–1887]:218–219.
- Garnier, J.H. 1888b. Snake poisons. *Proceedings of the Canadian Institute, Toronto*. Ser. 3, 5 [1886–1887]:255–261.
- Garnier, J.H. 1894. The snakes of Ontario. *The Empire*, October 6, p. 16.
- Greenwald, K., Stedman, A., Mifsud, D., Stapleton, M., Larson, K., Chellman, I., Parrish, D. L. and Kilpatrick, C. W. 2020. Phylogeographic analysis of mudpuppies (*Necturus maculosus*). *Journal of Herpetology* 54:78–86.
- Harris, J. P., Jr. 1954. How the mud-puppies were named. *Field & Laboratory* 22(1):8–23.
- Harris, J. P., Jr. 1961. The natural history of *Necturus*, IV. Reproduction. *Journal of the Graduate Research Center* (Southern Methodist University) 29(1):69–81.
- Hodgkins, J. G. 1856. Remarks on a Canadian specimen of the *Proteus* of the Lakes. *Canadian Journal of Industry, Science and Art* 1:19–23.
- Hopley, C. C. 1882. *Snakes: Curiosities & Wonders of Serpent Life*. Griffith and Farran, London. viii + 614 pp., frontispiece [distributed in the United States by E.P. Dutton & Co., New York.].
- Johnston, W. V. 1933a. John Hutchison Garnier of Lucknow, Ont. A Canadian naturalist and physician. *Bulletin of the Academy of Medicine, Toronto* 7(1):11–20.
- Johnston, W. V. 1933b. John Hutchison Garnier, a Canadian naturalist and physician. *The Canadian Medical Association Journal* 29(3):314–316.
- Jordan, D. S. 1880. *Manual of the Vertebrates of the Northern United States: Including the District East of the Mississippi River; and North of North Carolina and Tennessee, Exclusive of Marine Species*. Third Edition. Jansen, McClurg & Company, Chicago. 406 pp.
- Kelly, H. A. 1878. Identity of *Diemectylus miniatus* with *D. viridescens*. *The American Naturalist* 12:399.
- King, R. B., Oldham, M.J., Weller, W.F. and Wynn, D. 1997. Historic and current amphibian and reptile distributions in the island region of western Lake Erie. *American Midland Naturalist* 138:153–173.

- Klauber, L. M. 1956. *Rattlesnakes. Their Habits, Life Histories, and Influence on Mankind*. Two Volumes. University of California Press, Berkeley. xxix + pp. 1-708; xvii + pp. 709-1476.
- Latchford, F. A. 1887. Notes on Ottawa salamanders. *Ottawa Naturalist* 1:105-107.
- LeRay, W. J. 1930. The Rattlesnake (*Sistrurus catenatus*) in Ontario. *Canadian Field-Naturalist* 44:201-203.
- Logier, E. B. S. 1937. *The Amphibia of Ontario*. Royal Ontario Museum of Zoology, Handbook No. 3. Toronto, ON. 16 pp.
- Logier, E. B. S. 1939. *The Reptiles of Ontario*. Royal Ontario Museum of Zoology, Handbook No. 4. Toronto, ON. 63 + [8 leaves figure legends] + ii pp., 8 pls.
- Logier, E. B. S. 1952. *The Frogs, Toads and Salamanders of Eastern Canada*. Clarke, Irwin & Company Limited, Toronto. xii + 127 pp.
- Logier, E. B. S. and Toner G.C. 1955. *Check List of the Amphibians and Reptiles of Canada and Alaska*. Royal Ontario Museum Life Sciences Division Contribution 41. v + -88 pp.
- Logier, E. B. S. and Toner G. C. 1961. *Check List of the Amphibians and Reptiles of Canada and Alaska*. Royal Ontario Museum Life Sciences Division Contribution 53. vi + 92 pp.
- MacCulloch, R. D. 2002. *The ROM Field Guide to Amphibians and Reptiles of Ontario*. Royal Ontario Museum. Toronto, ON. 168 pp.
- Mackenzie, A. J. 1927. A Canadian naturalist; John Hutchison Garnier of Lucknow. *The Canadian Medical Association Journal*, 17:355-56.
- Matthews, F. S. 1898. *Familiar Life in Field and Forest. The Animals, Birds, Frogs and Salamanders*. D. Appleton and Company, New York. xvi + 284 pp. 25 pls.
- McIlwraith, T. F. 1886. *The Birds of Ontario, Being a List of Birds Observed in the Province of Ontario, with an Account of their Habits, Distribution, Nests, Eggs, &c.* A. Lawson & Co., Hamilton. 304 + iv + iv + vii pp.
- Moriarty, J. J. and Hall, C. D. 2014. *Amphibians and Reptiles in Minnesota*. University of Minnesota Press, Minneapolis. xii + 370 + [2] pp.
- Nash, C. W. 1905. Batrachians and reptiles of Ontario. pp. 5-18 in: *Check List of the Vertebrates of Ontario and Catalogue of Specimens in the Biological Section of the Provincial Museum. Batrachians, Reptiles, Mammals*. Ontario Department of Education, Toronto, ON.
- Nash, C. W. 1908. Batrachians and Reptiles of Ontario. Pp. 5-18 in *Manual of Vertebrates of Ontario*. [extracted from Nash (1905) and bound with other vertebrates]. Ontario Department of Education, Toronto, ON. 235 pp.
- Ngo, A., McKay, V. L., and Murphy, R. W. 2009. Recovery strategy for Tiger Salamander (*Ambystoma tigrinum*) (Great Lakes population) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Parks Canada Agency, Ottawa, Ontario. [4] + v + 29 pp.
- ORAA. 2023. *Ontario Reptile and Amphibian Atlas, 2009-2019*. Ontario Nature, Toronto. 443 pp.
- Paradis, R. O. 1982. Couper, William in *Dictionary of Canadian Biography*, vol. 11, University of Toronto/Université Laval, 2003-, accessed December 27, 2024, https://www.biographi.ca/en/bio/couper_william_11E.html.
- Patch, C.L. 1918. A list of amphibians and reptiles of the Ottawa, Ont. District. *Ottawa Naturalist* 32(3):53.
- Piersol, W. H. 1913. Amphibia. Pp. 242-248 in Faull, J.H. (ed.), *The Natural History of the Toronto Region, Ontario, Canada*. The Canadian Institute, Toronto.
- Pike, N. 1873. *Sub-Tropical Rambles in the Land of the Aphanapteryx. Personal Experiences, Adventures, and Wanderings in and around the Island of Mauritius*. Harper & Brothers, New York. [4] + xvi + 511 pp., 7 pls., 3 foldout maps.
- Pike, N. 1886. Some notes on the life-history of the common newt (*Diemysctylus miniatus viridescens*). *The American Naturalist* 20:17-25.
- Raffaëlli, J. 2022. *Salamanders & Newts of the World*. Penclen Édition, Plumelec, France. xix + 1100 pp.
- Roland, C. G. 1990. Garnier, John Hutchison in *Dictionary of Canadian Biography*, vol. 12 (1891-1900), University of Toronto/Université Laval, 2003-, accessed December 27, 2024.
- Rowell, J. C. 2012. *The Snakes of Ontario, Natural History, Distribution, and Status*. Jeffrey C. Rowell, [Toronto]. vi + 411 pp.
- Schmidt, K. P. 1953. *A Check List of North American Amphibians and Reptiles*, 6th Edition. Chicago, U.S.A.: American Society of Ichthyologists and Herpetologists and University of Chicago Press. viii + 280 pp.
- Slater, W.L. 1891a. *Catalogue of Mammalia in the Indian Museum, Calcutta*. Part II. Rodentia, Ungulata, Proboscidea, Hyracoidea, Carnivora, Cetacea, Sirenia, Marsupalia, Monotremata. Trustees of the Indian Museum, Calcutta. xxix + 375 pp.
- Slater, W. L. 1891b. *List of Snakes in the Indian Museum*. Trustees of the Indian Museum, Calcutta. x + 79 pp.
- Slater, W. L. 1892. *List of Batrachia in the Indian Museum*. Trustees of the Indian Museum, Calcutta. vii + 43 pp.
- Small, H. B. and Lett, W. P. 1884. Report of the zoological branch. *Transactions of the Ottawa Field Naturalists' Club* No. 5, 2(1):148-151.
- Toner, G. C. 1958. Rattlesnakes in Canada. *Bulletin of the Federation of Ontario Naturalists* 82:10-14.
- Toner, G. C. and N. de St. Remy. 1941. Amphibians of eastern Ontario. *Copeia* 1941:10-13.
- [Ure, G. P.] 1858. *The Hand-Book of Toronto; Containing its Climate, Geology, Natural History, Educational Institutions, Courts of Law, Municipal Arrangements, &c. &c.* Lovell and Gibson, Toronto. [i]-viii + 9-272 pp., frontispiece. [authorship given on title page as "a member of the press"].
- Whimp, G. 2008. Writing the Colony: Walter Edward Gudgeon in the Cook Islands 1898 to 1909. M.A. thesis, Victoria University of Wellington. vi + 110 pp.
- Williams, J. B. 1913. Reptiles. Pp. 238-242 in Faull, J. H. (ed.), *The Natural History of the Toronto Region, Ontario, Canada*. The Canadian 'Institute, Toronto.
- Wright, A. A. and Wright, A. H. 1942. *Handbook of Frogs and Toads of the United States and Canada*, 2nd ed. Comstock Publishing Company, Ithaca, NY. xi + 286 pp.
- Wright, A. H. and Wright, A. A. 1962 *Handbook of Snakes of the United States and Canada*, Volume III. *Bibliography*. A. H. and A. A. Wright, Ithaca, NY. 179 pp.

We suggest the following format for citing this article:

Bauer, A. M. 2025. John Hutchison Garnier (1823-1898) and his Contributions to the Herpetology of Ontario. *Bibliotheca Herpetologica* 19(5):35-56.



Eight weeks in Lobo Bay.
The Natuurkundige Commissie on New Guinea in 1828.
II. Serpentes (Colubridae, Elapidae, Typhlopidae) and Sauria
(Agamidae, Dibamidae, Gekkonidae, Varanidae)

Hans J. Jacobs¹ and Glenn M. Shea²

¹Siekenweg 8, D-33178 Borcheln, Germany, hjjacobs@gmx.de

²Sydney School of Veterinary Science, B01, University of Sydney, NSW 2006, Australia;

Australian Museum Research Institute, The Australian Museum,

1 William St, Sydney, NSW 2010, Australia, glenn.shea@sydney.edu.au

Abstract: The second group of the Dutch Natuurkundige Commissie spent nearly twelve years in the Dutch East Indies. Most of the scientists died during the expedition, with only Salomon Müller returning to the Netherlands with the collections. The progressive loss of the senior scientists, Boie and Macklot, resulted in Müller moving up the ranks of seniority and taking progressively greater responsibility for the collection and documentation of the zoological collections. The recent release online of the archival manuscript material from this expedition has allowed a better understanding of the extent of their collections. In this second part of our study of the archival material relating to the expedition's voyage to New Guinea in 1828, we document and translate the material relating to the eleven species of snakes and non-scincoid lizards: *Psamophis chlorogastra* Müll. and *Elaps oculiferus* Müll., *Dendrophis capistratus* Müll., *Dipsas lacrymans* Müll., *Tropidonotus picturatus* Müll., *Acontias polygrammicus* Müll., *Acontias coecus* Cuvier, *Calotes megapogon* Müll., *Hemidactylus baliatus* Müll., *Gonyodactylus Boiei* Müll., and *Varanus prasinus* Müll., as Müller chose to call them. We place these descriptions and images in the context of the state of knowledge of the reptile fauna at the time of the Natuurkundige Commissie, as well as the contributions they made to progressing knowledge of the region's herpetofauna, often involving formal publication of new taxa by Hermann Schlegel in Leiden and Duméril and Bibron in Paris, among others.

Key words: Natuurkundige Commissie, Dutch East Indies, New Guinea, Lobo, Hermann Schlegel, Salomon Müller, Pieter van Oort, Naturalis (Leiden), *Psamophis*, *Elaps*, *Dendrophis*, *Dipsas*, *Tropidonotus*, *Acontias*, *Calotes*, *Varanus*, *Hemidactylus*, *Gonyodactylus*, *Aspidermophis*, *Boiga*, *Dendrelaphis*, *Tropidonophis*, *Ramphotyphlops*, *Dibamus*, *Hypsilurus*, *Gehyra*, *Cyrtodactylus*

INTRODUCTION

The Dutch Natuurkundige Commissie spent many years in what was then known as the Dutch East Indies, collecting specimens and making natural history observations on the fauna of the region. Although the first group of the Natuurkundige Commissie, led by Heinrich Kuhl and Johan Coenrad van Hasselt, had been extremely successful in its collections and scientific study of the fauna of Java, recognition of that success was delayed due to the premature deaths of the two. This tragic end to the first expedition made it necessary to bring together and send a second group.

The second expedition, initially led by Heinrich Boie and operating between December 1825 and August 1837, was similarly to take a tragically high toll on its members. Only Salomon Müller would return to the Netherlands. Heinrich Boie, Gerrit van Raalten, Heinrich Macklot, Pieter van Oort, Alexander Zippelius and Ludwig Horner, not to mention many of the unnamed people in their support team

and the Dutch soldiers they worked with, died in the East Indies. Müller reported “meer dan twintig dooden” (more than twenty dead) within three months in the military “Fort du Bus” in Lobo Bay. He noted that their ship, the *Triton*, returned to Amboina (Ambon) from their survey of New Guinea in early September with “meer dan zestig zieken” (more than sixty sick) on board (Müller 1840–41:10).

Müller's published output was more limited than would be expected from the amount of work he accomplished during the nearly 12-year duration of the second Commissie, as well as being custodian of the writings of the other expedition members. Only the volumes “*Land- en Volkenkunde*” written by Müller, and “*Zoologie*”, mostly written in coauthorship with Hermann Schlegel, curator at the Rijksmuseum van Natuurlijke Historie in Leiden, appeared under his name, part of the three-volume “*Verhandelingen*” (1839–1844 [–47]), essentially the activity report on the expeditions of the Natuurkundige Commissie.¹ However, all were written in Dutch, which hampered their distribution and recognition outside of the Dutch-speaking world.

Müller's unpublished oeuvre, on the other hand, was much more extensive, and has recently made available online (Gassó et al. 2020). These journals and notes comprise more than 2,300 handwritten pages, of which barely 200 pages (folder NNM001001113) are dedicated to amphibians and reptiles. However, his handwritten notes are not only voluminous, but difficult to decipher, and a comprehensive account of the whole enterprise must be left to future work.

Instead, we confine ourselves to presentation and analysis of the herpetological collections made and described by Müller during the short period that the Commissie spent in New Guinea. This visit to New Guinea resulted in the first major land-based faunal collection from the New Guinea mainland.

Just over eight weeks (from 5 July to 29 August 1828) were spent on New Guinea near Lobo Bay, which, despite this short duration, turned out to be immensely successful scientifically. In this brief period, the natural scientists succeeded in obtaining “119 Vogelsoorten (...), die tot 60 geslachten behoorden” and of amphibians “36 soorten waarvan 15 hagedisachtigen, 15 slangen, één schildpadachtige en vijf kikvorsachtigen” (Mörzer Bruyns 2018:98–99; 119 bird species belonging to 60 genera; and 36 species of amphibians of which are 15 lizard-like, 15 snakes, one turtle-like, and five frog-like species).

Given that other records from this period, such as Macklot's notes and the relevant parts of van Oort's diaries, have been lost, Müller's notes are the only remaining records of the initial discovery and descriptions of the many previously unknown species the expedition found in New Guinea. These descriptions, however, are almost exclusively limited to zoological and taxonomic subjects. Apart from the indigenous naming of certain species, comprehensive insights into the scientific cooperation within the group, for instance, are scarce. Müller published his general observations on the region in the first chapter, about 80 pages long, “Bijdragen tot de kennis van Nieuw-Guinea” (Contributions to the knowledge of New Guinea; Müller 1840–41) in the “*Land-en Volkenkunde*” volume of Temminck's “*Verhandelingen*”, including information about the geography of New Guinea, its waterways, climatic conditions, as well as ethnology such as religious customs, descriptions of hamlets, arms, tools, clothes and ornaments, the attitude of the indigenous people towards foreigners, their customs and traditions, and finally a dictionary, of more than 120 words and numerals, in five regional languages. Unfortunately, he never describes the structure or collaboration within the Commissie. There are no hints on how the scientists collaborated or what instructions were provided to taxidermists and artists for their respective tasks. Similarly, details of daily life remain elusive. What was life like in the newly built fort, named “Fort du Bus” in honour of the General Commissioner Leonard du Bus de Gisignies? We know the scientists had to help construct the buildings and surrounding protective palisade, but we know nothing about the living conditions or food gathering

during that period. It can be assumed that the scientists had to contribute as hunters to sustain the fort. Under such conditions, the scientific achievements are remarkable.

In the first part of this project (Jacobs and Shea 2022), we discussed eleven species of skinks reported by Müller: *Scincus typhlocephalus*, *S. oxycephalus* and *S. tressianus*, *S. erytholaimus*, *S. biorchus*, *S. chalconotus*, *S. rabdognathus*, *S. pleurorabdus*, *S. maculosus* and *S. gracilis*, plus *Centroplites nigricans*. In this second part of our research into the Natuurkundige Commissie's activities in New Guinea, we focus on ten additional species of reptiles that Salomon Müller collected near Lobo Bay and on the Utanata River prior to arrival at Lobo Bay: *Psamophis chlorogastra* Müll. (= *Aspidomorphus schlegelii* Günther 1872), *Elaps oculiferus* Müll. (= *Aspidomorphus muelleri* Schlegel 1837a), *Dendrophis capistratus* Müll. (= *Dendrelaphis calligastra* (Günther 1867) or possibly *D. lorentzii* (Lidth de Jeude 1911)), *Dipsas lacrymans* Müll. (= *Boiga irregularis* (Bechstein 1802)), *Tropidonotus picturatus* Müll. (= *Tropidonophis picturatus* (Schlegel 1837a)), *Acontias polygrammicus* Müll. (= *Ramphotyphlops multilineatus* (Schlegel 1839a)), *Acontias coecus* Cuvier (= *Dibamus novaeguineae* Duméril and Bibron 1839), *Calotes megapogon* Müll. (= *Hypsilurus megapogon* (Duméril and Bibron 1837)), *Hemidactylus baliatus* Müll. (= *Gehyra serraticauda* Skipwith and Oliver 2014), and *Gonyodactylus Boiei* Müll. (= *Cyrtodactylus novaeguineae* (Schlegel 1844)) as Müller chose to call them. A final reptile, the varanid lizard *Varanus prasinus* Schlegel 1839b, was discussed extensively by Jacobs and Koch (2021) and is only briefly dealt with here for the sake of completeness.²

We focus on species that Müller described in detail, nine of which he evidently intended to publish in his name as indicated by the addition of his acronym to the names he assigned to them. *Acontias coecus*, which he attributed to Cuvier, is the only exception. Each of Müller's descriptions is accompanied by a drawing by Pieter van Oort, except those of *Acontias coecus* and *Gonodactylus Boiei*. The illustrations, like the notes, were obviously prepared on site.

Of course, the presentation of such texts cannot take place without embedding them in the context of the history of science. This contextualisation is unavoidable if one wants to understand their qualities. Müller's extraordinary achievements in particular must be judged against the background of his origins as the son of a pub owner and his relatively limited school education, ultimately without a university foundation (Jacobs 2022). Originally employed as a taxidermist, he developed into an outstanding naturalist in a team with the scientists Heinrich Boie and Heinrich Macklot.

Just as Kuhl and van Hasselt in the first expedition had visited the leading museums and scientists in Central Europe to prepare for their expedition, Boie, the original leader of the second Commissie, accompanied by Coenraad Jacob Temminck, the first director of the newly founded Rijksmuseum in Leiden, also visited the Natural History Museum in Paris for four months (Susanna 1834:37–38).

There they met Alexander von Humboldt and Georges Cuvier. Even though Müller did not take part in this trip himself due to his role as a taxidermist, the knowledge gained there by his senior colleagues undoubtedly had a major influence on him through his interactions with them. In addition, the large number of books available to the scientists provided an extensive source of existing knowledge that was incorporated into the writing of the diverse notes created by Müller. In van Hasselt's bequest alone (Gassó et al. 2020:NNM001001213) are listed 130 titles of an impressive, specialised library which was quite up to date, including works by Daudin, Cuvier, Linné, Lamarck and Russell, to name but a few. In addition, there were titles by Kuhl, Tiedemann, Temminck and others from their immediate environment, together providing a thorough basis for scientific work. The often months-long waiting times during the expedition, for example at the Cape of Good Hope en route to the East Indies, were obviously used for joint study, from which Müller benefited immensely.

However, as we know from a letter from Boie to Wagler (H. Boie 1827:724), the largest fund for their scientific work was bequeathed to them through the considerable collection and the detailed notes and drawings of the first group. From these and his studies of other collections, Boie had prepared an extensive herpetological manuscript, the "*Erpétologie de l'île de Java*". Boie had initially prepared this work for eventual inclusion in the work on the Natuurkundige Commissie's activities. However, due to Boie's death, the publication of this legendary work was first delayed and later abandoned.³

In presenting Müller's notes, we frame these in light of the source material for his descriptions.

A second major focus of our work considers the contemporary impact of Müller's collections and writings: what significance did both the scientific work and the drawings of the often-unknown species attain?

On Müller's return to Leiden, his collections and notes, along with the artworks created by the artist Pieter van Oort, were passed on to Hermann Schlegel, Boie's replacement as Curator at the museum, for study. Schlegel extensively incorporated Müller's notes, and had van Oort's illustrations engraved, often with modification, for publication in his two major herpetological works, his "*Abbildungen*" (1837–44) and "*Essai*" (1837), yet he often did not use Müller's names for the species, obscuring many of Müller's contributions. By comparing Müller's original manuscripts with Schlegel's published writings, we are able to demonstrate how extensively Müller's work influenced Schlegel.

Another sphere of influence includes naturalists who, like Boie and Temminck in their earlier visit to Paris, travelled to Leiden to study the latest exhibits. This also resulted in many descriptions of new taxa. Conversely, many specimens were sent to other institutions and universities in exchange for material from other parts of the world. In the Museum National d'Histoire in Paris, for example, there is evidence of many specimens collected by the Natuurkundige Commissie.

This exchange was in part due to a visit by Schlegel to Paris between April and July 1835 (Kaiser et al. 2021:59) and his interactions with Duméril and Bibron, which led to a considerable number of descriptions by the two French scientists.

Taken together, the two parts of our study represent only a portion of what the members of the Commissie achieved in the Lobo Bay region and covers only a small part of the totality of Müller's handwritten notes.

ELAPIDAE

PSAMOPHIS CHLOROGASTRA MÜLL., *ELAPS MUELLERI*
SCHLEGEL (IN PART) (= *ASPIDOMORPHUS*
SCHLEGELII GÜNTHER 1872)

This is the first snake species description from Lobo Bay reproduced in the digital archive (Gassó et al. 2020), though not the first species collected by the Commissie in New Guinea. As noted by Jacobs and Shea (2022), the compiled distributions and images in the digital archive are not reproduced in chronological or taxonomic order.

Within the two decades following Müller's description, for the species listed in the undated "Catalog der auf Neu-Guinea erhaltenen Reptilien" (NNM001001423_001; Catalog of reptiles obtained from New Guinea) as "*Psamophis* [sic!] *chlorogastra*", Schlegel provided two descriptions. The first (Schlegel 1837a) was published the same year Müller returned to Leiden and was named in his honour as *Elaps muelleri*. The second description was published eight years later in collaboration with Müller (Schlegel and Müller 1845 part 4:66–68) in the 12th instalment of the "*Zoologie*" volume of Temminck's *Verhandelingen* (Temminck 1839–1844 [–47]).

Schlegel (1837a part 2:453)⁴ based his first description on "deux individus très différens l'un de l'autre" (two individuals very different from each other), which were obtained by Müller on the west coast of New Guinea "et dont feu van Oort a tracé les portraits d'après le vivant" (and whose portraits were drawn from life by the late van Oort).

Indeed, the two specimens exhibit notable differences. Schlegel points out differences in their pattern and colouration as well as squamation. The ventral counts he gives for the two specimens, 176 + 32 (ventrals + subcaudals) and 148 + 24, are strikingly similar to the numbers recorded in Müller's "Catalog" (NNM001001423_001): 171 + 33 and 145 + 25, respectively. Schlegel gives measurements for the two specimens as 0.45 + 0.06 and 0.36 + 0.045, referring to snout-vent length and tail length.

In the second description, Schlegel and Müller (1845) refer to three specimens: the two original specimens collected by Müller and another, not shown on the plate, collected on the island Rawak (near Waigeo). This specimen was obtained by Jean René Constant Quoy and Joseph Paul Gaimard during the *Uranie* expedition, which visited Rawak and nearby islands between 16 December 1818 and 6 January



Fig. 1. *Psammophis chlorogastra*/*Elaps Muelleri* (Schlegel and Müller 1845: Tab. 9, drawn by Pieter van Oort “ad vivum”, engraved by J. M. Kierdorff). Schlegel pictured the two specimens on one page, as he considered both to belong to the same species, while they were originally drawn by van Oort as separate taxa. On the left is *Psammophis chlorogastra* of Müller now *Aspidomorphus schlegelii* (see as well: NNM001000630 and Fig. 2 below) and on the right *Elaps oculiferus* of Müller (see as well: NNM001000626 and Fig. 4 below), today’s *A. muelleri*.

The prints in Schlegel’s work were created in black and white (see NNM001000873_043), and each copy had to be coloured individually. In the final printed plate, the animals depicted often appear as mirror images of the original. The engraver transferred the original drawing directly onto the stone, causing the inversion during the printing process.

1819 (Freyinet 1829). The Rawak specimen measured 400 + 35mm with ventral scale counts of 166 + 36. The location for this specimen was given as “de eilanden Rawak en Waigiou” (Schlegel and Müller 1845 part 4:67; the islands Rawak and Waigeo).

Schlegel (1837a) mentions the specimens in his possession have lost their beautiful colours due to preservation, indicating his description of colour was based on van Oort’s drawings. Duméril et al. (1854:1234) list the measurements as 455 mm + 60 mm and 440 mm + 35 mm and scale counts of 176 + 42, 166 + 36 and 148 + 24. Although they mention only having two specimens in their own collection, the similarity to the three values provided by Schlegel and Müller (1845) suggests that they repeated the values from Schlegel’s accounts instead of examining their own two specimens, although transcription errors are plausible.

The second specimen on Schlegel and Müller’s plate (Fig. 1) is likely to be the one listed in Müller’s “Catalog” right underneath *P. chlorogastra* as “*Elaps oculiferus* Müll”, a name later changed to “mulleri” (NNM001001423_001), probably by Schlegel.

Schlegel’s differentiating description of the two specimens calls for a comparison with the drawings: “Le premier individu a la lèvre supérieure ornée d’une raie couleur de rose, qui se prolonge sur les côtés du cou” (Schlegel 1837a part 2:453, The first individual has a rose-coloured stripe on the upper lip, extending down the sides of the neck). This clearly corresponds with the left one of the two specimens (Fig. 1). A closer look reveals that Fig. 2, van Oort’s original, represents the same specimen, although the posture is different. As already explained the mirror-image reproduction is a consequence of the fact that the engraver of Fig. 1 retained the orientation of the drawing, so that the



Fig. 2. The image of the snake as a whole “*Psammophis chlorogastra* Müll.” (NNM001000630) was flanked by precise head and tail scalation studies. The colour of the belly obviously evoked the epithet: “chlorogastra”, green-bellied.

Written above the original name, in Müller’s own handwriting is “*Elaps mülleri* var.”. In the lower lefthand corner: “N. Guinea Lobo”; in the right corner: “P. van Oort”. The shadowy (only slightly indicated) suggestion of an originally intended posture emphasises the character of the drawing, which was created on site. The engraver for the published version in Schlegel’s “*Essai*” (1837a) obviously preferred the alternative posture here only indicated in the outer contours and the scales.

printed image was reversed. In addition, the upper body as well as the abdomen/tail are differently positioned in the printed image, although this was already indicated as an alternative placement in pencil on the original drawing.

Schlegel's description of the other individual—on the right side of Schlegel's compilation (Fig. 1, see as well Fig. 3)—is somewhat sparse, pointing to the head “qui offre en outre une tête d'un vert foncé et parsemé de nombreuses taches rondes ou ovales, noires et bordées de jaune” (Schlegel 1837a part 2:453, it also has a dark green head with numerous round or oval black spots with yellow borders).

These differences raise questions about why Schlegel evidently overruled Müller and subsumed the individuals Müller assigned as two species into only one taxon, but he may have been persuaded by their similarity in other aspects. This is reminiscent of Schlegel's complaint that the skinks were taxonomically too finely divided (Jacobs and Shea 2022) describing only two of the many species Müller had collected and named. The head studies of van Oort (Figs. 2 and 3) which Schlegel omitted in his combination (Fig. 1) indeed show a rather similar scalation: we see two internasals and prefrontals, a row of three scales representing the two supraoculars and a median frontal, and two large parietals in both studies.

In the undated transport-list of reptiles from New Guinea, the “Catalog”, only one specimen of *Psammophis chlorogastra* (NNM001001423_001) appears, which was crossed out subsequently without any name given as substitute. Immediately underneath in the same list is a specimen of *Elaps oculiferus* Müll, which was subsequently corrected in pencil to “muelleri”. One specimen “*Elaps* (?) *oculiferus* Müll” is recorded in the later “Catalogus” list of February 1831 (NNM001001436_004). Since both lists are in Müller's hand, he obviously assigned the two specimens to different genera.

Psammophis, a generic name first published by Fitzinger (1826), and meaning “sand-snake” in reference to the habitat of the snake, originally described a species from Africa, *Coluber sibilans* Linnaeus (1758). Fitzinger's book appeared just after the Commissie left Europe. However, as reported by Schlegel (1826, 1827), Fitzinger was known to have used, without specific attribution, some of the unpublished names from Boie's “*Erpétologie de Java*”, with Schlegel (1826, 1827) and Heinrich Boie's brother Friedrich (F. Boie 1826, 1827) crediting Heinrich as the author of the name.⁵ Hence, it is likely that Müller would have obtained the name from Boie, either directly or through the manuscript and/or plates

of the “*Erpétologie de Java*” after Boie's death. According to Schlegel (1826, 1827) Heinrich's original concept of *Psammophis* included five species, one of which, *Psammophis pulverulenta* (attributed by Schlegel to Kuhl and van Hasselt but by Friedrich Boie (1827) to Heinrich's monograph), now *Psammodynastes pulverulentus*, is widespread in Indonesia, hence negating the seeming geographic discontinuity between Müller's New Guinea species and Fitzinger's original type species for the genus.

Elaps, created by Schneider (1801)—possibly from the Latin *elabor*, to slip away (Schneider did not provide an etymology for his new generic name)—the basis for the family Elapidae, are characterised by permanently erect fangs at the front of the mouth, and Elapidae is the family to which both of Müller's species are now assigned. Schneider's original *Elaps* included a variety of species now placed in five different families, while Fitzinger's *Elaps* was largely based on the American coral snakes (now *Micrurus*) but did include one Indonesian species—*Elaps furcatus* Schneider 1801, now *Calliophis intestinalis* (Laurenti 1768). Boie's concept of *Elaps*, as presented by Schlegel (1826, 1827), included nine species, with three from Asia.

Eight years later, the redescription of *Elaps muelleri* by Schlegel and Müller (1845), noted the same differences in colour without any interpretation that this might suggest more than one species. Linguistically, this later description of the species suggests that it was written by Müller alone, since Schlegel was not member of the expedition—they write how “wij” detected this “nieuwe soort, door ons alleen op Nieuw-Guinea waargenomen, (...) in de maand augustus 1828” (Schlegel and Müller 1845, part 4:67, we detected this new species, observed by us only on New Guinea, (...) in the month of August 1828), suggesting Müller had by then accepted Schlegel's identification of the specimens as representing a single species.

Returning to the first published description by Schlegel (1837a), the distinguishing characteristics from other species of *Elaps* refer mostly to the head, which is “peu distincte du cou, alongée, étroite, déprimée, à museau assez court, conique et un peu concave”, “les yeux sont plus gros que d'ordinaire”, “huit labiales”, “15 rangées d'écaillés en rhombe” and finally “la queue est courte et conique” (Schlegel 1837a part 2:453–454; not very distinct from the neck, elongated, narrow, depressed, with a fairly short, conical and slightly concave muzzle; the somewhat bigger eyes; eight labials; 15 rows of rhombic scales). These criteria can be easily discovered in Müller's handwritten notes (below).



Fig. 3. “*Elaps oculiferus* Müll” (NNM001000626), with “Mülleri” written above the name in pencil. In the lower left corner Müller notes the origin: “Nieuw=Guinea (Lobo).”, while in the right corner the name of the draughtsman is recorded: “P: v. Oort”.

MÜLLER'S MANUSCRIPT IN TRANSCRIPTION AND ENGLISH TRANSLATION

(Gassó et al. 2020: NNM001001113_068) (Fig. 4)

Psamophis [= *Psammophis*, in error] *chlorogastra* Müll.⁶ [crossed out]
Elaps Mulleri Schlegel [above the line, by Müller himself]

*Neu=Guinea (Lobo)**August 1828*

146 + 25.

Gz. Lg. [= ganze Länge] mit Schz. [= Schwanz] 1' 3" 3 ½'''⁷
 [= 415 mm], Schz. [= Schwanz] 1" 6''' [= 41 mm]; Kopf lang
 7''' [= 16 mm], hinten breit 3 ½''' [= 8 mm], hoch über der
 Stirn 2 ½''' [= 6 mm]. —

Kopf kaum unterschieden, ringförmig platt gedrückt;
 Wirbelschild länglich, vorne dreieckig, hinten mit
 abgerundeten Seiten, stumpfspitzig; Hinterhauptschild
 unregelmäßig, fünfseitig; 2 Stirn- u. 2 Schnauzschilde,
 Nasenlöcher klein, rundlich [above the line], etwas schräg
 nach hinten gerichtet. Rumpf gleich dick; Schz. [= Schwanz]
 stätig, kurz mit stumpfer Spitze; Schuppen rautenförmig,
 sechseckig, glatt. — Ganze obere Seite des Körpers [crossed
 out] Kastanien braun; Oberlippen mit der Seite des Kopfes
 u. Halses leicht weinröthlich, sehr fein schwarz punktiert; von
 den Nasenlöchern durch die Augen ganz 1" [= 27 mm] den
 Hals herab zieht sich ein gerader ungefähr [above the line]
 [crossed out] x [unreadable] , " breiter kastanienbrauner
 Längsstreif. [crossed out] alle unteren Theile des Körpers
 schmutzig spangrün, an den Seiten der Schilder fein schwarz
 getüpfelt. —

146 + 25.

Whole length with tail 415 mm, tail 41 mm; head length 16
 mm, breadth behind 8 mm, height above the forehead 6 mm.

Head scarcely distinguished ring-shaped, depressed; frontal⁸
 elongate, anteriorly triangular posteriorly with rounded sides,
 bluntly pointed; parietals irregular, pentagonal; 2 prefrontals
 and 2 internasals, nostrils small, roundish, directed somewhat
 obliquely posteriorly. Torso equally thick; tail steady, short
 with blunt tip; scales diamond-shaped, hexagonal, smooth.
 — Entire upper side of body chestnut brown; upper lips with
 the side of the head and neck slightly wine-reddish, very
 finely dotted with black; from the nostrils through the eyes
 approximately 27 mm and down the neck there is a straight,
 approximately [unreadable] " wide maroon longitudinal
 stripe. All lower parts of the body dirty dull green, finely
 dotted with black on the sides of the shields. —

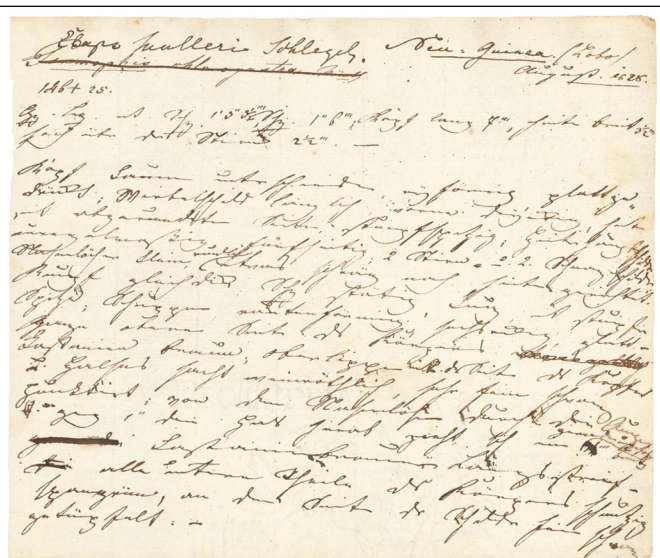


Fig. 4. Facsimile of Müller's unpublished description of *Psamophis chlorogastra* Müll. (NNM001001113_068).

While Muller, writing at the time the expedition was in the field, uses the spelling Lobo for the locality, Schlegel and Müller (1845 part 4:68) later use the spelling Langoeroe Bay. This was possibly more akin to the indigenous pronunciation of the locality; today's Triton Bay honours the corvette *Triton* used for this expedition.

ELAPS OCULIFERUS MÜLL. (= ASPIDOMORPHUS MUELLERI (SCHLEGEL 1837A))

The second specimen on Fig. 1, considered by Schlegel to be synonymous with *P. chlorogastra* and therefore placed on one sheet by Schlegel and Müller (1845), was identified as a different species by Müller. A comparison of Müller's notes on the two taxa points to the snout: while the head of *P. chlorogastra* is rather roundish, slightly depressed and barely separated from the body, the head of *E. oculiferus* is bluntly truncated, aspects which are reflected in the illustrations (Fig. 2, 3) as well. Müller emphasises that the frontals are anteriorly triangular in the first species and almost cut off in the second but triangular posteriorly.

In the first species, from the nostrils through the eye there is a chestnut-brown longitudinal stripe, which changes to a general brown further along the body. In contrast, the second species has a yellow stripe on the side of the neck from about the level of the eye, which narrows and disappears about 4 cm behind the head, with prominent eye-like spots on the neck. Müller also seems to have based his chosen epithets on this latter feature: "oculiferus", deriving from the Latin "oculus" and "fero", meaning bearing eyes, referring to the spots on the nape "unter welchen sich besonders 3 größere Augenflecken auszeichnen" (see Müller's description below; among which three larger eye-spots are particularly prominent) forming a triangle.

According to Müller, this species generally has a “dunkel bleifärbten bräunlichen Rücken” (dark leaden brownish back), which becomes darker on the tail. The ventral side is “blaß grünlich gelb” [pale greenish yellow] and the throat “lividschwärzlich” [bluish-black]. However, a “breiterer cit-

ronengelber Streif” [broader lemon yellow stripe] is particularly emphasised, which he mentions together with Schlegel later as a “bleek citroengele, fijn zwart gezoomde streep” (Schlegel and Müller 1845 part 4:68; pale lemon yellow, fine black laced stripe), which stands out clearly in the drawing.

MÜLLER'S MANUSCRIPT IN TRANSCRIPTION AND ENGLISH TRANSLATION

(Gassó et al. 2020: NNM001001113_069)

Elaps p. oculiferus [epitheton crossed out, first abbreviated epitheton unreadable]⁹
Mulleri Schlegel [over the line by Müller's own hand]

Neu=Guinea (Lobo)

August 1828

174 + 33.

Ganze Länge mit Schz. [= Schwanz] 1' 7" [= 433 mm]; Schz. [= Schwanz] 2" 2 ½" [= 60 mm], Kopf lang 7 ½" [= 16 mm] hinten breit 4 ¾" [= 11 mm] hoch über der Stirn 3" [= 7 mm]. — Körper rundlich, Kopf länglich, fast gleich breit; Schnauze stumpf abgeschnitten; Augen 1" [= 2.4 mm] groß; Nasenlöcher klein, rundlich; Wirbelschild länglich vorne beynahe recht [unreadable] abgeschnitten, hinten spitz dreieckig; 2 Stirn und 2 Schnauzenschilder von gewöhnlicher Form; Rüßelschild klein, unten mit einem herzförmigen Eindruck, oben abgerundet, kaum auf die Haube vortretend; 2 Hinterhauptschilde, die längliche Seite mit stumpfer Spitze; auf jeder Seite oben und unten 7 Randschilder; u. 4 längliche schmale Rinnenschilder; darunter 4 Reihen Kehlschuppen. Schuppen klein, länglich mit stumpfer Spitze, u. ganz glatt. Scheitel u. Nacken schön dunkelgrün mit vielen schwarzen hellen eingefassten Punkten, unter welchen [crossed out] sich besonders 3 größere Augenflecken auszeichnen [over the line] die eine Triangel bilden [crossed out] im Nackenstreifen; eine schwarze Linie zieht sich vom hinteren Augenwinkel längst der Seite des Nackens, gegen 10" [= 24 mm] lang herab, [over the line] wo [crossed out] alsdann beyde durch einen nicht sehr deutlichen, gekrümmten, dunklen Querstreif vereinigt werden; u. so den helleren Nacken von dem dunkel bleifärbten bräunlichen Rücken schniedet [in error: “scheidet”]; unter dieser schwarzen Linie, längst der Seite des [crossed out] Halses zieht sich ein breiterer citronengelber Streif, längst dem Rande des Kehlschildes, gegen 16" [= 36 mm] abwärts, wo er fein ausläuft; dieser Streif so wie mehrere gleichgefärbte (gelbliche) Flecken auf den vordersten oberen Randschildern ist fein schwarz [crossed out] punktiert; [crossed out] untere Hälfte der 2 hintersten Randschilder einfarbig schwarz; Randschilder der Unterlippen oben gelb gesäumt; Kinn u. Kehle lividschwärzlich [livid = blueish]; Bauch u. untere Seite des Schzs. [= Schwanzes] blaß grünlichgelb; dicht mit bleifärbten Pünktchen u. Strichelchen besetzt, die an den Rändern des Schildes so dicht gedrängt stehen,

070¹⁰

daß solche daselbst fast ganz in diese Farben übergehen; auf dem unteren Theil des Schzs. [= Schwanzes] stehen die dunklen Pünktchen etwas spärlicher als auf dem Bauch, besonders der obere Theil desselben, u. auch die obere Seite des Schzs. [= Schwanzes] ist bräunlicher als der Rücken. — Nur ein Individuum. —

174 + 33.

Entire length with tail 433 mm; tail 60 mm, head length 16 mm width at the back 11 mm height above forehead 7 mm. —

Body roundish, head elongate, almost equally broad; snout bluntly truncate; eyes 2.4 mm large; nostrils small, roundish; frontal shield elongate anteriorly nearly truncated, posteriorly acutely triangular; 2 prefrontal and 2 internasal shields of ordinary shape; rostral shield small, at the bottom with a heart-shaped impression, rounded on top, barely protruding on the hood; 2 parietal shields, the elongated side with blunt tip; on each side above and below 7 labial scales; 4 elongated narrow gular scales; below 4 rows of throat scales. Scales small, elongated with blunt tip, and quite smooth.

Crown and nape beautifully dark green with many black light bordered dots, among which 3 larger eye-spots are particularly prominent forming a triangle in the nape stripe; a black line descends from the rear eye-corner along the side of the neck, approximately 24 mm long, where then both are combined in a not very distinct, curved, dark transverse stripe; thus separating the lighter neck from this dark lead-coloured brownish back; below this black line, along the side of the neck, a broader lemon yellow stripe runs along the edge of the throat shield approximately 36 mm downwards, where it tapers off finely; this stripe, as well as several (yellowish) spots of the same colour on the foremost upper labial shields, is finely dotted with black; the lower half of the 2 rearmost labial shields is unicoloured black; the labial shields of the lower lips are fringed with yellow at the top. The chin and throat are livid blackish; the belly and lower side of the tail are pale greenish yellow; densely covered with lead-coloured dots and dashes, which are so densely crowded at the edges of the shield that they almost completely merge into these colours there. On the lower part of the tail the dark spots are somewhat sparser than on the belly, especially on the upper part of it, and also the upper side of the tail is more brownish than the back. —

Only one individual. —

It is surprising to us that Müller did not compare the two species, possibly because he did not consider them closely related since he placed them in different genera. The descriptions are bound as successive pages (NNM001001113_068 and _069), and both collected at Lobo Bay in August 1828. His manuscript descriptions are, however, on different paper formats, which raises the question of when and by whom the order of these sheets of paper was determined. Was this the notebook Müller used on site? Or was the order of the pages, arranged roughly by genus, determined by him or someone else later?

In van Oort's "Lyst der teekeningen" (NNM001001115; list of drawings), unfortunately undated, we find one drawing of each species: *P. chlorogastra* and *E. oculiferus*. This confirms that Müller initially considered them to be distinct species.

While Schlegel (1837a) considered both of Müller's specimens as representing the same species, Günther (1872), with additional specimens, recognised them as different, naming the species represented by Müller's *Psamphis chlorogastra* as *Diemenia schlegelii*. Günther primarily based his description on two additional specimens from Misool, purchased in 1870 from the London natural history dealer Charles Jamrach. However, Günther, by including citation of one of the snakes figured in Schlegel and Müller in his description of *Diemenia schlegelii*, makes Müller's *chlorogastra* specimen, the subject of that figure, a third syntype of *schlegelii*.

Brongersma (1934) resurrected Fitzinger's 1843 name *Aspidomorphus* as the genus for both species. He also recognised Schlegel's error in combining two species under the single name *muelleri*, and provided an extensive comparison between the two. Brongersma reviewed the history of the two species and identified past errors, particularly noting that Günther had erroneously allocated the snakes illustrated by Schlegel and Müller to the wrong taxa—the snake in their Fig. 2 with the spotted head (Müller's *ocelliferus*) was the one with the high ventral counts, while Günther had identified *schlegelii* as having lower ventral counts. Consequently, Brongersma assigned the name *Aspidomorphus schlegelii* to the snake figured on the left of Schlegel and Müller's plate (Fig. 1)—*Psamphis chlorogastra* in Müller's original handwritten terminology. Accordingly, the snake on the right side, which Müller named *Elaps oculiferus*, is now *Aspidomorphus muelleri*. Brongersma also identified Müller's original specimens in the Naturalis collection in Leiden: RMNH.RENA 1402, Lobo, collected by Müller, for the holotype of *muelleri* (Fig. 5) and RMNH.RENA 1403, same data, for the *schlegelii* specimen. McDowell (1967) provided redescriptions of the two species, noting also that *schlegelii* (which he misspelled as *schlegeli*) differs from *muelleri* in features of the maxillary bone and anterior mandibular dentition. Although Brongersma recognised multiple subspecies within *muelleri*, later morphological and genetic studies (McDowell 1967; Metzger et al. 2010)

have failed to find evidence for these subspecies, although the genetic work suggests that *A. muelleri* and *A. schlegelii* may harbour cryptic species in eastern New Guinea (Metzger et al. 2010).

Although the taxonomy of *Aspidomorphus* remains to be completely resolved, it is obvious that Müller was correct in his initial assessment, distinguishing two species at Lobo Bay.

COLUBRIDAE

DENDROPHIS *CAPISTRATUS* MÜLL. (= *DENDRELAPHIS* *CALLIGASTRA* (GÜNTHER 1867) OR *D. LORENTZII* (LIDTH DE JEUDE 1911))

Müller's description of this snake is based upon one specimen only, which was almost one metre long. The black stripe which runs through the eyes along the "Rüßelschild" (rostral) suggests the Latin epithet "*capistratus*" (harnessed). Next to the entry in his undated "Catalog" (NNM001001423), Müller records the scale numbers 182 + 129, which differ from the ones given in his description below. In a footnote, he points out that it is the only species on the list that was not caught near Lobo Bay, but a few weeks earlier "von der Rivier Utanata" (NNM001001423; from the Rivier Utanata). The expedition arrived at the Utanata River on 3 June and stayed there for a week (Jacobs and Shea 2022).

In addition to this specimen from New Guinea, Müller mentions three other *Dendrophis* species in his other writings: *Dendrophis decorus* (NNM001001113_159) from Java and Sumatra; *D. rhodopleuron* (_161–162) from Amboina, and *D. picta* (_163) from Timor (Koepang), which is "Überall auf Timor gemein" (common everywhere on Timor). For the latter, above the line—apparently inserted later—we find the addition "u. Samao" (and Samao). Müller thus clearly distinguished several species within the genus.¹¹

Tree snake specimens also feature several times in the transport lists, but without any specimen specifically from New Guinea. In the transport list of an early shipment in 1826, we find three specimens listed as *Dendrophis picta* Boie, collected by Kuhl and van Hasselt from the First Commissie.¹² This shipment was sent off years after Kuhl's and van Hasselt's deaths, most probably by van Raalten, on 31 April and arrived at the Museum on 23 July 1826. To our knowledge this is the only shipment-list that was compiled subsequently in the Netherlands to document receipt of a shipment by Schlegel.

Müller, however, gives the place of origin for his own *pictus* as Koepang on Timor. In his "Catalogus" shipment-list of 1831, we find three entries for *Dendrophis*. The first is an entry of two specimens of "*Dendrophis* ?" "van Timor" (NNM001001436_004) which is one of the very rare cases that Müller left the exact species denomination open. Again he seems to be forced to add a question mark on the next page under the heading "van Poeloe Samao en Java": "*Dendrophis* ? 3. [specimens]". And a third time Müller puts a question mark in connection with this genus, listing three specimens

from Amboina as “*Dendrophis polychrans* ? Rein[wardt].” which he corrected himself with “*rhodopleuron*?” adding a question mark, though.¹³

Müller draws a comparison to his own description of *D. decorus* in his description of *capistratus* and emphasizes the colouration of the upper parts as “olivengrün” (NNM001001113_163; olivegreen) and the lower side of the body and tail as “hell gelblichgrün” (bright yellowgreenish). Obviously, Müller considered *D. decorus* to be the species most similar to his *D. capistratus*.

Without direct examination of the specimen used by Müller to describe *D. capistratus*, a reliable assignment to taxa accepted today will not be possible. The taxonomy of the genus in New Guinea (now *Dendrelaphis*¹⁴) remains incompletely resolved. The most recent revision, by Rooijen et al. (2015), recognises nine species in the region, but many of these are poorly defined; and the authors of that study were only able to examine limited samples, leaving distributions uncertain. One possible identification would be

Dendrelaphis calligastra (Günther 1867), a species described from Cape York in Australia, but now recognised as wide-ranging across New Guinea and the Solomon Islands as well as north Queensland; specimens assigned to that species were collected as far west as the Vogelkop, and south to the Aru Islands, but not yet from the south coast of Indonesian New Guinea (Rooijen et al. 2015; Rooijen and Vogel 2016). A second possibility (see Jacobs and Shea 2022:50) is *D. lorentzii* (Lidth de Jeude 1911), described from a specimen from Sabang, on the Lorentz River, approximately 300km east of the Utanata River, but also on the south side of Indonesian New Guinea. Although this species is “very closely related to *Dendrophis calligaster*” (Lidth de Jeude 1911:274), it differs from it in colouration, number of ventrals and subcaudals, and relative eye size (Rooijen et al. 2015). The specimen described by Müller appears to have subcaudal counts more in the range of *lorentzii*, but the illustration by van Oort (Fig. 6) does not show the speckled head dorsum that characterises that species (Rooijen et al. 2015).

MÜLLER'S MANUSCRIPT IN TRANSCRIPTION AND ENGLISH TRANSLATION

(Gassó et al. 2020: (NNM001001113_160)

Dendrophis capistratus Müll.

[crossed out, *picta* (variet.) above the line]

Neu=Guinea (Fluß Utanata)
Juny 1828

185 + 130.

Gz. Lg. [= Ganze Länge] mit Schz. [= Schwanz] 3' 3''' [= 982 mm]; Schz. [= Schwanz] 1' [= 325 mm]; Kopflang 9 ²/₃''' [= 22 mm], hinten breit 4 ¹/₂''' [= 10.2 mm], hoch über der Stirn 3''' [= 6.8 mm].

Totalhabitus ganz wie *Den. decorus*. y.

Grundfarbe der obern Theile olivengelblich, mit kupferrothlichen Anstrich; ein schwarzer Streif zieht sich um das Rüßelschild, die Nasenlöcher einschließend durch die Augen, und so gegen 6" [= 163 mm] längs jeder Seite des Halses / da gewöhnlich eine Schuppe einnehmend, abwärts; untere Seite des Körpers u. Schzs. [= Schwanzes] gelblichblau, an den Rändern der Schilder schwach röthlich u. schwärzlich marmorirt. Iris rothlichbraun. — Schuppen glatt. —

Nur ein Individuum vom Fluße Utanata. —

185 + 130.

Whole length with tail 982 mm; tail 325 mm; head length 22 mm, breadth behind 10.2 mm, height above forehead 6.8 mm.

Total habitus quite like *Den. decorus*. y.

Ground colour of upper parts olive-yellowish, with a copper reddish tinge; a black stripe extends around the rostral shield, including the nostrils, through the eyes, and so about 163 mm along each side of the neck / usually occupying one scale, downwards; lower side of the body and tail yellowish blue, edges of scales faintly reddish and blackish marbled. Iris reddish brown. — Scales smooth. —

Only one individual from the Utanata River. —



Fig. 5. The holotype of *Elaps muelleri* Schlegel preserved in Leiden (RMNH 1402; photo: M. O'Shea in 2014). The subspecies designation on the label refers to the division of *Aspidomorphus muelleri* into subspecies by Brongersma (1934), although these subspecies are no longer recognised (Metzger et al. 2010).

COLUBRIDAE

***DIPSAS LACRIMANS* MÜLL. (= *BOIGA IRREGULARIS* (BECHSTEIN 1802))**

Müller's description of this species notes that only a single specimen was collected at Lobo Bay, a specimen that can no longer be identified in the Naturalis collection. Comprehending the complex issues around Müller's description of the species and Schlegel's subsequent treatment of that species name requires an initial review of the knowledge of *Dipsas* species names available to and used by Müller and Schlegel.

Dipsas was originally described by Laurenti (1768) for a single species of snake thought to be from Zeylona (Sri Lanka), but now known to be from South America. At the time of the second group of the Commissie, the genus had been expanded to include a number of Asian snakes—mostly now in the genus *Boiga*, commonly known as cat-eyed snakes. Boie had paid particular attention to the cat-eyed snakes in his work for the “*Erpétologie de Java*”. While that work remains unpublished and the original manuscript largely lost, we can obtain an indication of his conclusions from the inclusion

of some of the Latin diagnoses from it that were published in Friedrich Boie's classification of snakes (F. Boie 1827). Friedrich listed eight *Dipsas* species from Asia, four of which were new and accompanied by descriptions ascribed to his brother's manuscript, while also ascribing some of the specific names to others preceding his brother:¹⁵ *cynodon* Cuv[er]., *dendrophila* Reinwardt, *drapiezii*¹⁶ and *multomaculata* Reinw[ardt]., as well as a previously described species, *irregularis*, all of which are still considered valid species of *Boiga*. While Boie attributed *irregularis* to Merrem, it had actually been described many years earlier as *Coluber irregularis* by Bechstein (1802). The publication of descriptions of the first four species, extracted from his brother's manuscript, validated the names.

In Müller's and van Oort's manuscripts in the online-archive, the names *cynodon*, *dendrophila* and *drapiezii* are used, with the same attributions of names to Reinwardt and Cuvier. As we have noted for previous species, it is unlikely that Friedrich Boie's paper, published in 1827, had reached the Second Commissie by the time they were in New Guinea, and hence they must have been working with Heinrich's “*Erpétologie*



Fig. 6. The caption of the original drawing reads: “*Dendrophis capistratus* Müll. n. sp.” (NNM001000651_001). The epitheton and abbreviation of the name are crossed out and “*picta* var” is written above by Müller himself; so, we find here precisely the same correction as in Müller’s description (see below). In the right-hand corner Müller—as so often—noted the name of the artist “P: van Oort”, while in the left again the location is recorded: “Neu=Guinea 1828. (Rivier Utanata)”.

The copy (NNM001000651_002) bears the caption, written on auxiliary lines to guarantee a clean and straight typeface: “*Dendrophis capistratus* n sp Mull”, without any correction, and in the line below “Nieuw Guinea (Riv Oetanata)”.

de Java” manuscript or plates after his death, or at least been very familiar with the manuscript prior to Boie’s death.

Schlegel was also familiar with Boie’s species, listing them in 1826 with the aim of preventing others from publishing the names themselves (Schlegel 1826, 1827) and dealt with them after Boie’s death in his “*Essai*” (the more extensive account covering all species) and his “*Abbildungen*” (covering *drapiezii* as an example). These published accounts are supplemented by manuscript notes by Schlegel (NNM001001389) in the online-archive.¹⁷

The modern identity of Müller’s *Dipsas lacrymans* is clear, as only one species of *Boiga* is known from New Guinea: *B. irregularis*, and the illustration by van Oort closely resembles that species. However, Schlegel considered *lacrymans* to be conspecific with *Dipsas drapiezii*, which does not occur in New Guinea.

In Müller’s undated “Catalog” (NNM001001423) only one specimen is listed under the name *lacrymans*—with the correction “*Drapiezii*” in pencil in Schlegel’s hand above the crossed-out epithet.

Dipsas lacrymans also appears in the “Catalogus” shipment-list of February 1831 (NNM001001436_004). We cannot be sure about the relation of the two lists—they may both refer to the same specimen, or two different individuals (the latter would have to involve a specimen from a different locality).

In van Oort’s undated list of his drawings (NNM-001001115_002) four entries refer to drawings of *Dipsas*. For the first entry, an epithet is lacking; possibly Müller had not identified the taxon yet or was unsure of its identity. The second listing is to *Coluber irregularis* Merr. (now *Boiga irregularis*). Following this is *Dipsas lacrymans* Müll (which we presume relates to the illustration reproduced here as Fig. 7) and then *Dipsas Drapiezii* Boie (presumably referring to the painting reproduced as Fig. 8) which suggests again—as with *Psammophis chlorogastra* and *Elaps oculiferus*—that Müller considered *D. lacrymans* and *D. drapiezii* to be different taxa and instructed van Oort accordingly, while Schlegel considered the two to be synonymous and corrected “*lacrymans*” to “*Drapiezii*” (see below, and Fig. 7, version_002).

There are two paintings of *Dipsas* from Lobo Bay (NNM001000654_001–002), both originally labelled as *D. lacrymans*. The first is reproduced here (Fig. 7), while the second—according to the editors of the online-archive—is a duplicate.

Although the duplicate is very precise, closer examination reveals slight deviations in detail, even though the contours of the snakes are absolutely congruent. This precision suggests that freehand drawing was unlikely; perhaps the outlines were traced, possibly with needles. The reasons why some drawings in the online-archive were copied are unknown. It is not known who copied them and when—it is conceivable that they were copied in Leiden and annotated by Schlegel. The different captions indicate that _001 is the original.

As in similar cases, this drawing gives insights into Pieter van Oort’s procedural manner, which was commonly used by

many draftsmen in the field. With an abundance of natural history specimens collected at Lobo Bay over a short period, he initially focused on the distinctive, taxonomically significant parts of the body, likely pointed out to him by the scientists. The completion of the painting could then be deferred.

The differences between the two versions are minute and insignificant for taxonomic purposes. The overall structure and even the arrangement of the scales remain consistent, with slight variations primarily in colouration and pattern. The duplicate drawing, annotated by Schlegel as “*Dips. Drapiezii*” much later, after its arrival in the Netherlands, logically cannot have been the one referred to in van Oort’s list as “*Dipsas Drapiezii*”, sent to the Netherlands in February 1831. It is unlikely that van Oort, who left his original drawing only half-finished, would have had time to create a duplicate incomplete drawing at the time.

A third drawing (Fig. 8) further complicates the understanding of Schlegel’s interpretation of the taxonomy of Indonesian cat-eyed snakes. The caption of this drawing bridges both *Dipsas Drapiezii* and *Coluber irregularis*.

We are convinced Müller himself wrote the original caption on this drawing. The reference to the variation—added with a different pen—appears to be from Schlegel.

The picture is reminiscent of quite a few of van Oort’s drawings with only the anterior, head, and the tail completed in detail (compare Fig. 7 and Fig. 8). Tapos on Java, where the snake was caught according to the first version of the drawing (Fig. 8), is an area between today’s Bogor and Jakarta. The snake depicted in Fig. 8 and labelled as *Dipsas drapiezii* must have been caught during the expedition from Buitenzorg to Tapos around July/August 1827, while Boie was still alive and prior to the Commissie leaving for New Guinea, whereas the snake illustrated in Fig. 7 was collected in the vicinity of Lobo Bay a year later. In his notes on *Dipsas lacrymans* Müller does not mention the snake previously collected near Tapos and depicted on Fig. 8.

In our view the snakes illustrated in Figs. 7 and 8 represent different species of *Boiga*, and neither represents *B. drapiezii*. The snake in Fig. 7 originates from New Guinea and has a clearly drawn loreal scale indicating it is *irregularis* and not *drapiezii*. The snake in Fig. 8 represents a species from Java, within the range of *drapiezii*, and although it is so labelled, it does not resemble that species. The green head, pale upper lip, reddish body, and very narrowly-spaced dark bands on the body are characteristic of *Boiga nigriceps* (Günther 1863), while *drapiezii* has a very different colour pattern, with more widely-spaced body bands and the head is not green.

Schlegel’s confusion over the identity of *drapiezii* is understandable. In his “*Essai*”, he notes that in addition to the “very old” Lobo Bay specimen, Boie had told him he had also seen specimens of *drapiezii* from Ceylon (Sri Lanka) in the collection of the South African Museum, and that Schlegel had also received two specimens from Manado in Celebes (Sulawesi) from a Dr Strauss. Neither locality is currently considered part of the distribution of *drapiezii* (de Silva 2001; de Lang and Vogel 2005).



Fig. 7. *Dipsas lacrymans* (NNM001000654_001). A second illustration (_002) is labelled as a copy of _001 by the editors of the online-archive and is not reproduced here.

The first, slightly larger sheet _001 is inscribed by Müller in the familiar manner: at the bottom centre “*Dipsas lacrymans* Müll n. sp.”, in the right corner the name of the draughtsman “P. van Oort” and in the left the locality “N. Guinea. 1828. (Bay Lobo)”. In contrast, on _002, in different handwriting—obviously Schlegel’s—is the species name “*Dips. Drapiezii* très vieuve” (very old) with the addition below “*lacrymans* Müll”. The name of the draughtsman in the right corner is missing; on the left we read “N. Guinée” in French and below “Baie Lobo”. In his “*Essai*”, though, Schlegel specifies that “un très vieux individu” was obtained “à la côte occidentale de la Nouvelle Guinée” by Macklot and Müller (Schlegel 1837a part 2:270; a very old specimen, on the west coast of New Guinea). The same description is provided by Schlegel in his “*Abbildungen*”, in German. So, the same individual is assigned to two different species: *Dipsas lacrymans* by Müller on site and *Dipsas drapiezii* by Schlegel years later in Leiden.

In his handwritten, unpublished notes on *D. drapiezii* (NNM001001389_023), Schlegel noted differences from *Dipsas cynodon*, such as “le museau beaucoup plus court” and “à tronc moins haut” (the snout much shorter, with a lower trunk); but in *D. drapiezii* “La plaque du frein manque ordinairement” (the frenal [loreal] scale is usually missing). Apart from the absence of a loreal, Schlegel does not specify the head scalation, however, he included two meticulous head studies at the beginning of his notes. He concludes his notes with the scale count of “259 + 114” and “264 + 154”. Overall he describes the snake: “Formes et taille à peu près de Cynodone” (forms and size approximately that of Cynodone).

While Schlegel appears to have been confused over the morphological and distributional limits of *Dipsas drapiezii*, he had

seen specimens of the species, as the illustration accompanying his description of *drapiezii* in his “*Abbildungen*” (Fig. 9) does represent that species. The account of the species in his “*Essai*” (Schlegel 1837a part 2:270–271) mentions several specimens collected by the members of the Commissie: about six individuals collected by Boie “dans les forêts vierges du Parang”, as well as the “variété” “recueillie dans les forêts près de Tapos”, and the “très vieux” individual from New Guinea (from the virgin forests of Parang; collected from the forests near Tapos; very old individual). The latter two represent respectively *Boiga nigriceps* (Fig. 8) and *B. irregularis* (Fig. 7), but the former six may be *B. drapiezii*, with “Parang” very similar to the locality name “Parung” annotated on Fig. 9. Similar information was provided in the “*Abbildungen*” (Schlegel 1839a:49).

MÜLLER'S MANUSCRIPT IN TRANSCRIPTION AND ENGLISH TRANSLATION

(Gassó et al. 2020: NNM001001113_093)

Dipsas lacrymans Müll. [crossed out, above the line. *Drapiezii* Boie]

Neu=Guinea August (Lobo) 1828.

267 + 102.

Länge des Körpers, von der Schnzspitze [= Schnauzenspitze] *bis zum Schz.ende* [= Schwanzende] 6' 6" [= 2113 mm]; *Schz.* [= Schwanz] *cylindrisch* [crossed out, above the line], *stumpfspitzig* 1' 1" [= 29 mm]; *Kopflang* 1" 5 ²/₃" [= 40 mm] *hinten breit* 11 ¹/₂" [= 26 mm]; *hoch über der Stirn* 7 ²/₃" [= 17 mm] — *Augen* 3" [= 6.8 mm].

Gestalt im Ganzen durchaus [above the line] *wie Dip[sas].: dendrophila* *Rw. und cynodon* *Cuv.* [above the line]. *Körper stark comprimirt; Kopf noch breiter als der Hals, dick, herzförmig; Augen groß, hochliegend mit einem noch größere sc[uta]. supercil[aria]. bedeckt. Nasenlöcher ebenfalls groß, schräg nach hinten* [etwas = crossed out] *aufwärts, vertical oval auslaufend. 9 Schilder auf der Haube; Wirbelschild kurz, breit vorne und ein wenig concav; hinten stumpf dreieckig; Rüßelschild hoch u. breit, herzförmig, oben stumpfeckig auf die Haube vorspringend; auf jeder Seite der oben Kinnlade 9 Randschilder; unten auf Seite 1 Nasen= u. 12 Randschilder. Die Schuppen des Körpers sd.* [= sind] *rhombisch; die der mittleren Reihe größer u. sechseckig; durchaus glatt. Schz.* [= Schwanz] *stättig, cylindrisch mit stumpfer Spitze; die Farbe der obern Theile ist ein graubepudertes Braun mit einzelnen schwärzlichen Fleckchen, welchen letztere auf dem Hinterhals* [wo sie= crossed out] *mehrere zum Theil unterbrochene Querbinden bilden; ebenso zieht auch ein etwas unterbrochener schwärzlicher Längsstreif vom Hinteraugenwinkel längs der Seite des Occiputs: Grundfarbe des Bauches blaß gelb licht* [in error; = lich] *bläulichgrau marmorirt u. jedes Schild noch gegen dem Seitenrand zu, mit einem dunklen Fleck versehen; auf der untern Seite des Schzs.* [= Schwanzes] *ist die bläulichgraue Schattirung als die Grundfarbe zubetrachten auf der nur sehr feine blaß gelbliche Pünktchen u. Fleckchen stehen. — Iris gelb.*

Nur ein Exemplar. —

267 + 102.

Length of body, from tip of snout to end of tail 2113 mm; tail cylindrical, blunt-tipped 352 mm; head length 40 mm breadth behind 26 mm; height above the forehead 17 mm — eyes 6.8 mm.

Shape on the whole quite like *Dipsas*: *dendrophila* *Rw.* and *cynodon* *Cuv.* Body strongly compressed; head even broader than neck, thick, heart-shaped; eyes large, high-set, covered with an even larger supraocular. Nostrils also large, slanting sideways and slightly upwards, vertically oval tapering. 9 shields on the hood; frontal shield short, broad in front and little concave; behind bluntly triangular; rostral shields high and broad, heart-shaped, at the top bluntly angular protruding on the hood; on each side of the upper jaw 9 labial shields; below on each side 1 nasal and 12 infralabials. The scales of the body are rhombic; those of the middle row larger and hexagonal; quite smooth. Tail stubby, cylindrical with blunt tip; the colour of the upper parts is a grey-powdered brown with singular blackish spots, the latter forming several partly interrupted transverse bands on the neck; likewise a somewhat interrupted blackish longitudinal stripe runs from the posterior corner of the eye along the side of the occiput: ground colour of the abdomen pale yellowish bluish grey marbled, and each scale has a dark spot towards its edge; on the lower side of the tail the bluish-grey shading is to be regarded as the ground colour on which there are only very fine pale yellowish dots and spots. — Iris yellow.

Only one specimen. —

Müller's attribution of the epithets *dendrophila* and *cynodon* to Reinwardt and Cuvier respectively is curious and reflects a similar attribution by Friedrich Boie (1827). Boie refers to Heinrich's unpublished "*Erpétologie de Java*" for both attributions, which apparently relate to unpublished manuscript names in the Leiden and Paris collections respectively (see also Duméril et al. 1854:907, 1087).

Whether Müller was enticed by the large eyes of the *Dipsas* to choose "weeping snake" *Dipsas lacrymans*—"lacrimare" means to weep in Latin—as a name must remain uncertain. In the drawing of its head, at least, a tear-like element cannot be discerned, and the notes do not give any indication of the name either.

Why Müller named his Lobo Bay *Dipsas* as a new species remains puzzling in light of the prior work on the genus by Boie. Although the specimen described by Müller still appears in the undated transport-list of reptiles preserved on New Guinea, the "Catalog" (NNM001001423_001) as "*Dipsas lacrymans*", a specimen of "*Dipsas Drapiezii* Boie" is also found in the "Verzending M" transport-list of February 1831 (NNM001001437_002) next to seven specimens of "*Dipsas irregularis* Merr." from Ambon. Müller must therefore have known *D. drapiezii* not only via Boie's "*Erpétologie de Java*" but from living specimens as well. As the first specimens had already been caught and drawn on Java in 1827, he already knew the taxon when he described his *D. lacrymans* on New Guinea in 1828, and therefore must have considered it different to *drapiezii*. At the same time, he must have collected *irregularis* on Ambon either prior to the time in New Guinea or afterwards, and also considered it different from his *lacrymans*.

TROPIDONOTUS PICTURATUS MÜLL. (= *TROPIDONOPHIS PICTURATUS* (SCHLEGEL 1837A))

Van Oort (NNM001001115_002) mentions five different *Tropidonotus* species in his list of drawings, four of which he attributes to Boie and one to Müller: *T. picturatus* Müll., *T. rhodomelas* Boie, *T. subminiatus* Boie, *T. chrysargos* Boie and *T. trianguligerus* Boie. Only the first species occurs on New Guinea.

Nevertheless, today Schlegel (1837a) is attributed as first describer for *T. picturatus*, *T. chrysargos* and *Rhabdophis subminiatus*, while Heinrich Boie in F. Boie (1827) is given credit for *Xenochrophis trianguligerus* and *Rhabdophis rhodomelas*, although Boie attributes the latter name to Reinw[ardt].

In his first description of the species *picturatus*,¹⁸ Schlegel in his "*Essai*" points out in his very first sentence that it was Müller who had named "un Tropidonote inconnu jusqu'à présent" (Schlegel 1837a part 2:314; a hitherto unknown *Tropidonotus*). From the details of Schlegel's text, one must suspect that he had before him not only the specimens caught and sent by Müller, but also Müller's handwritten description (see below). And more than that: Müller had by 1837 already returned home and was of course available to his superior and sometimes co-author with all the information he needed.

Schlegel mentions "ils en ont recueilli cinq individus près de la baie Lobo" (1837a part 2:314; they collected five individuals near Lobo Bay) and expressly refers to the specimens captured and described by Müller with the qualification "que les belles teintes qui ornent la tête et le cou s'effacent totalement après la mort" (1837a part 2:314–315; that the beautiful hues on the head and neck fade completely after death). His colour indications thus are necessarily adopted directly from Müller and from van Oort's drawing (Fig. 10). The fading of colours in alcohol over the decade between the collection of the specimens by Müller in August 1828 and their examination by Schlegel for his publications from 1837 is also apparent in the ventral colours: Schlegel reported the venter as only "d'un brun terne" (p. 315; a dull brown), which Müller described as "schmutzig blaß gelb" (dirty pale yellow).

From the eye, "deux raies noires", which are also very clearly marked on the head studies that accompany Schlegel's description ("*Essai*" Atlas, Pl. XII, figs. 8–9; two black vertical stripes), run along the side of the neck; the upper side of the body is "d'un brun schisteux noirâtre" (blackish slate brown) in Schlegel's vocabulary. The colour of the iris both conformably describe as reddish brown: Müller—see below—"rothbraun" (reddish brown) and Schlegel in his "*Essai*" (p. 315) "d'un brun rouge" (of a brownish red). More interesting than the similarities may be the differences: Schlegel concludes by emphasising "l'intérieur de la bouche rouge de brique, mais les lèvres sont jaunes" (p. 315; the inside of the mouth [is] brick red, but the lips are yellow), information that is missing in Müller. Clearly, Schlegel used other models besides the five specimens captured by Müller. Thus, the numbers of scales given also differ: Müller's "135 + 65 – 134 + 57" are contrasted with Schlegel's "128 + 52 or 134 + 62", although there is of course no evidence that the two used the same specimens for their count. The length figures of "0,45 + 0,14" for adults in Schlegel correlate roughly with 42.5 + 14 cm in Müller; the difference is negligible. Besides Müller's five specimens Schlegel had access to another individual from the Paris Natural History Museum: "M. M. Quoy et Gaimard ont rapporté un seul individu de cette nouvelle espèce" (Schlegel 1837a part 2:314; Messieurs Quoy and Gaimard reported a single individual of this new species). Quoy and Gaimard collected in western New Guinea, within the range of *T. picturatus*, on two occasions, first during the *Uranie* expedition, when they visited Rawak and nearby islands between 16 December 1818 and 6 January 1819 (Frey-cinet 1829) and later during the first voyage of the *Astrolabe*, when they visited Dorei (modern day Manokwari) between 25 August and 6 September 1827 (Duyker 2014). We know for certain that Schlegel was in Paris from April to July 1835 (Kaiser et al. 2021:59), well after both expeditions had returned to France. Müller himself did not reach the Netherlands again until about two years later, at the end of August 1837, the same year that Schlegel's "*Essai*" appeared. The insights gained by Schlegel in Paris may have been incorporated into the preparation of the manuscripts. Müller's hand-



Fig. 8. *Dipsas Drapiezii* var Schleg 270 (NNM001000702). The name of the artist is not given and according to the editors of the online-archive “unknown”; it may be assumed that it was Pieter van Oort, who had already drawn the species for Boie’s “*Erpétologie de Java*” (pl. 38). The first line reads “Dipsas” in Müller’s hand, followed by “Drapiezii var. Schleg 270”, in a different hand, presumably added by Schlegel, the number referring to the page in Schlegel’s “*Essai*” where this specimen is again identified as a variety of *D. drapiezii*. In the line below is: “*Coluber irregularis* Merr.,” again in Müller’s hand, and still beneath that the location information: “Java / Tapis 1827”.

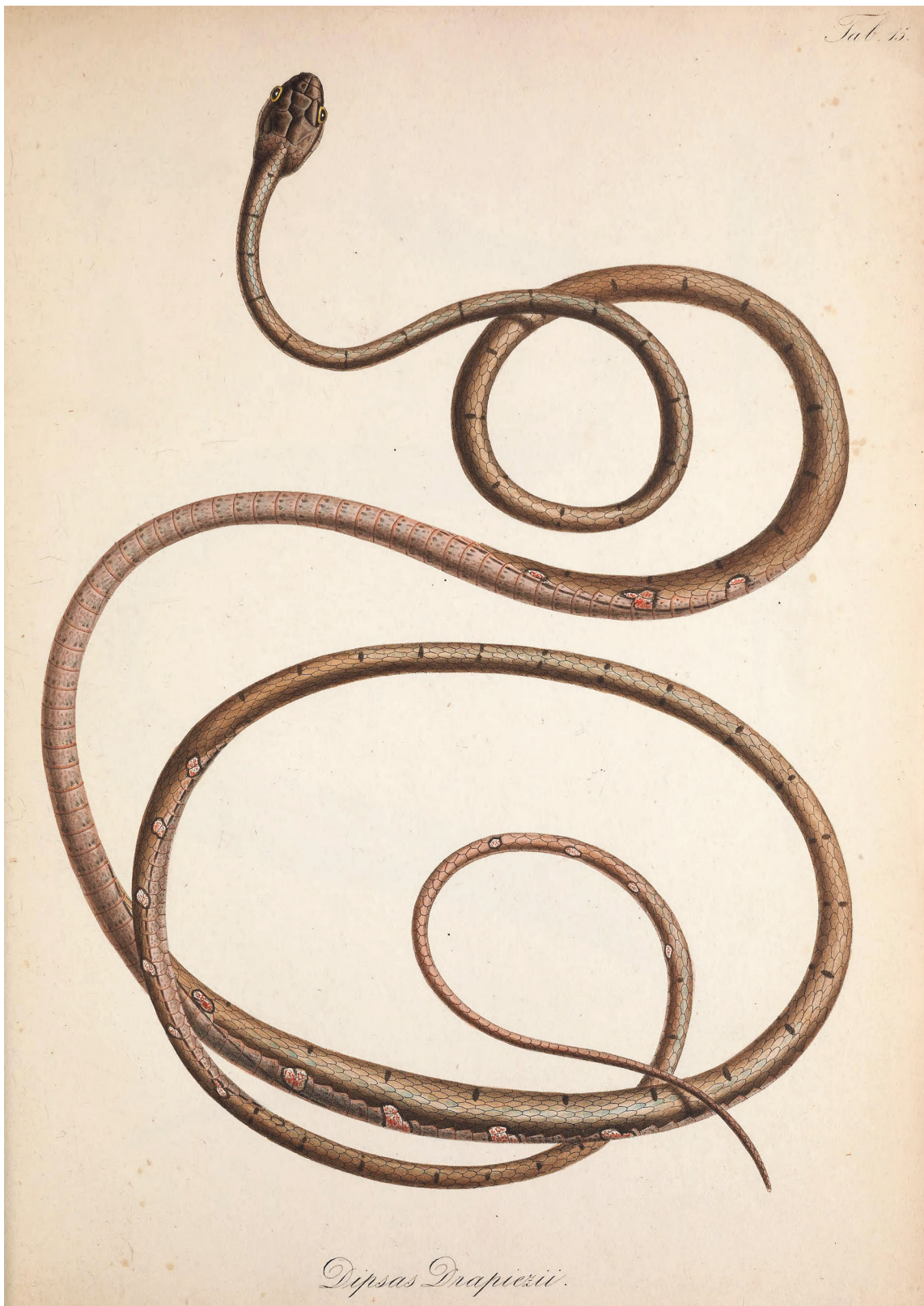


Fig. 9. *Dipsas Drapiezii* (Schlegel 1837–44 Atlasband: Tafel 15 [published in the second decade in 1839; Jacobs and Koch 2021:71]). NNM001000653 (not reproduced here) is the original template of this illustration. It shows the name of the snake as well as the reference "Tab. 15" at the top of the sheet and a barely readable indication as to the place of discovery "Parung Tesi 1827" in handwriting. Although the posture of the anterior of the body is maintained in the printed version, the entire posterior portion has been rearranged. The artist—likely van Oort—had indicated an alternative position of the tail.

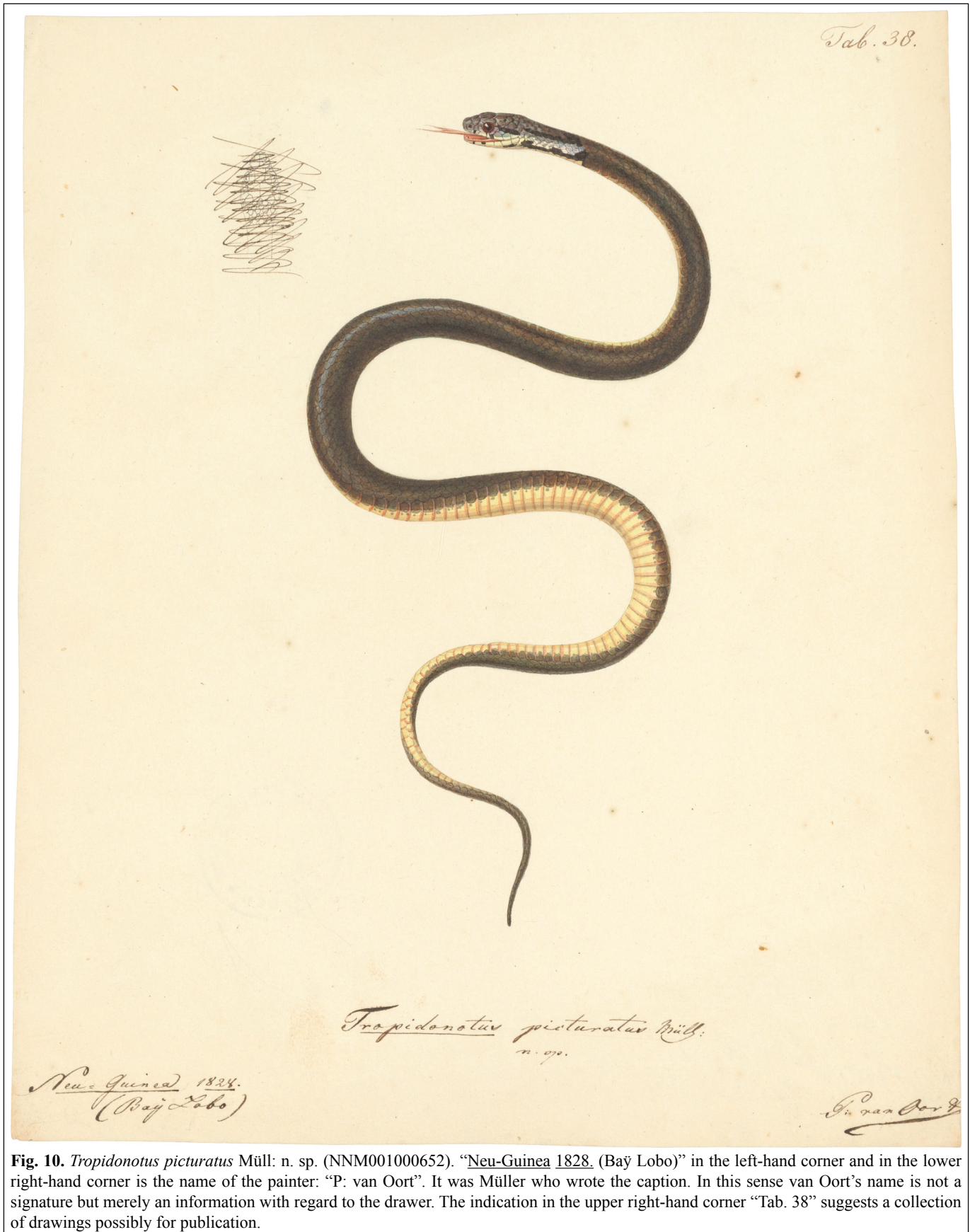


Fig. 10. *Tropidonotus picturatus* Müll: n. sp. (NNM001000652). “Neu-Guinea 1828. (Bay Lobo)” in the left-hand corner and in the lower right-hand corner is the name of the painter: “P. van Oort”. It was Müller who wrote the caption. In this sense van Oort’s name is not a signature but merely an information with regard to the drawer. The indication in the upper right-hand corner “Tab. 38” suggests a collection of drawings possibly for publication.

written notes may also have reached Schlegel shortly before the publication of his “*Essai*”.

Again, the moral dimension of Schlegel's basing his work on Müller's achievement should not and cannot be assessed here (Jacobs 2022:39), although it does contrast with the insistence in his previous writings for recognition of the primacy of Boie's names (Schlegel 1826, 1827). Schlegel does, after all, publish his description of Müller's *T. picturatus* in a broader monograph covering snakes in general. He does clearly identify the origin of the taxa described, even if he does not explicitly cite Müller's handwritten notes as a source. And on a legal level, he undoubtedly felt legitimised as a superior to dispose of knowledge that his subordinate, who was also paid for this, had obtained. In contrast, Boie was Schlegel's peer, his predecessor at the Natural History Museum at Leiden.

MÜLLER'S MANUSCRIPT IN TRANSCRIPTION AND ENGLISH TRANSLATION

(Gassó et al. 2020: NNM001001113_098)

Tropidonotus picturatus Müll.

135 + 65 — 134 + 57

Gz. Lg. [= Ganze Länge] mit Schz. [= Schwanz] 1' 8" 10" [= 565 mm]; Schz. [= Schwanz] 5" 2" [= 140 mm]; Kopf lang 7 1/3" [= 17 mm], hinten breit 5" [= 11 mm], hoch über der Stirn 2 3/4–3" [= 62–68 mm]. —

Kopf unterschieden, länglich oval, an den Wangen etwas aufgeblasen, von da oben seitlich nach vorn zu stark abschüßig; Schnauze abgeflacht; Nasenlöcher: klein, rundlich, Augen 1 1/2" [= 3.4 mm] groß; 9 Schilder auf der Platte, von gewöhnlicher Form; Rüsselschild breit, oben rundlich unten concav; nur wenige Schuppen an der Kehle; die Schuppen des Rückens u. Schwzs. [= Schwanzes] mittelmäßig länglich, viereckig u. überall stark gekielt. —

Kopf u. Nacken gräulich braun, letzteres mit bläulichem Anstrich; vom unteren= u. hinteren Augenrand ziehen sich zwei schwarze Längsstreifen in gleicher Entfernung schräg nach der Kehle, wo jeder am Ende durch eine Reihe Flecken ausläuft; ebenso steht noch auf jeder Seite des Nackens ein beynahe gleichlanger ebenfalls schwarz Längsstrich in deren Mitte sich ein ähnlich gefärbter Quersfleck befindet; u. endlich auf dem Occiput bemerkt man noch einzelne, mehr oder weniger große, schwärzliche Tropfen. Rücken u. obere Seite des Schwzs. [= Schwanzes] dunkelbraun mit olivengelblichen Anstrich; die Seite der Schilder haben bei dieser Farbe einen bleifarbenen Anflug; Lippen, Kehle u. alle übrigen unteren Theile schmutzig blaß gelb, am unteren Rande sind die Schilder röthlich gelb angelaufen.

Iris rothbraun. —

Scheint ziemlich gemein zuseyn. In mehreren Exemplaren. —

Neu=Guinea. August (Lobo) 1828

135 + 65 — 134 + 57

Whole length with tail 565 mm; tail 140 mm; head length 17 mm, breadth behind 11 mm, height above forehead 62–68 mm. —

Head distinguished, elongated oval, somewhat inflated at cheeks, from up there laterally to the front rather much sloping; muzzle flattened; nostrils: small, roundish, eyes 3.4 mm large; 9 shields on the plate [likely referring to the flat head dorsum], of common shape; rostral shield broad, roundish above, concave below; only a few scales on the throat; the scales of the dorsum and tail moderately elongated, quadrangular and strongly keeled everywhere. —

Head and neck greyish brown, the latter with a bluish tinge; from the lower and rear eye corner two black longitudinal stripes extend diagonally in the same distance from each other to the throat, where a row of spots runs diagonally from each one and each one fades out in a row of spots. Likewise, on each side of the neck there is a black longitudinal stripe of almost equal length, in the middle of which there is a similarly coloured transverse spot; and finally, on the occiput one notices individual, more or less large, blackish drops. The back and upper side of the tail are dark brown with an olive-yellowish tinge; the side of the scales have a lead-coloured tinge in addition to this colour; lips, throat and all other lower parts are dirty pale yellow, at the lower edge the shields have a reddish yellow tinge.

Iris reddish brown. —

Seems to be quite common. Several specimens. —

Although Schlegel's "*Essai*" mentions five individuals caught near Lobo Bay, other numbers appear in Müller's transport-lists. In a rather draft-like and undated "Catalog" (NNM001001423), three specimens are mentioned together with the scale number 133 + 56, counts which do not appear in Müller's description. The "Catalogus" list of February 1831 (NNM001001436_004) also records three specimens. Under the label "Reptilien van Nieuw-Guinea, Amboina en Timor" from the "Verzending M", also from February 1831 (NNM001001437_002), two specimens are given.

The genus name *Tropidonotus* (from the Greek τροπίς (tropis) = keel and νοτός (notos) = back, alluding to the keels on the scales on the dorsal surface) was first published by Heinrich Boie (1826) in a paper dealing with Japanese amphibians and reptiles. He created the name as a modification of the name *Tropinotus*, previously published by Kuhl and van Hasselt (1822a), and also by a marginal remark by Kuhl when he reported by letter (8 Aug. 1821): "Von Schlangen erhielten wir noch 1 neuen *Tropinotus*, so dass deren Zahl jetzt 12 beträgt" (Kuhl and van Hasselt 1822b:475; From snakes we received 1 new *Tropinotus*, so that their number is now 12). Both of the latter papers provided insufficient detail to validate the name nomenclaturally, thus leaving Boie as the author. *Tropidonotus* was maintained as the name for the aquatic colubrid snakes for much of the next century, until it was replaced by the older *Natrix* Laurenti 1768 by Stejneger (1907), who identified *Coluber natrix* Linnaeus as the type species for *Tropidonotus*. With later splitting of *Natrix* into multiple genera (Malnate 1960; Malnate and Underwood 1988), the lineage representing the watersnakes of the Australopapuan region was given the name *Tropidonophis* (meaning "keeled snake"), a name first created as a subgenus of *Tropidonotus* by Jan (1863:72).

While Kuhl and van Hasselt (1822a) did not provide a description of *Tropinotus* in their published work, Kuhl's manuscripts include much more detail. In his handwritten, unpublished notes (NNM001001036_209–219), Kuhl describes no less than 16 new species of the genus. Schlegel was not only aware of these notes, but in many cases added references and corrections to them. Thus, the syllable "-do-" is found several times above the name "*Tropinotus*" to become "*Tropidonotus*", and references to Boie's "*Erpétologie de Java*" and other taxa also appear.¹⁹

The epithet of the species discussed here, "*picturatus*", refers to the pattern which looks as if "painted" or "embroidered". Of the five specimens collected by the expedition, three are still identifiable: RMNH 1076 and 1077 (two specimens under the latter number; Malnate and Underwood 1988:135), with RMNH 1076 being designated lectotype. All are registered as from Lobo Bay; collected by Müller and Macklot.

TYPHLOPIDAE

ACONTIAS POLYGRAMMICUS MÜLL. (= *RAMPHOTYPHLOPS MULTILINEATUS* (SCHLEGEL 1839A))

Müller described two species, *Acontias polygrammicus* and *Acontias coecus*, that he ascribed to the genus *Acontias*, a genus first created (as a subgenus of *Anguis*) by Georges Cuvier in 1816 in the first edition of his "*Le Règne Animal*".²⁰ The subsequent histories of Müller's *Acontias* species are complex, with neither being related to *Acontias* proper.

The question of genus affiliation alone makes the problem obvious. *Acontias*, in present taxonomy, is a limbless skink genus only known from Africa. Müller is aware of this when he refers to Duméril and Bibron (1839) in a nota bene on the page before his description of *A. polygrammicus* (see below): "NB. In der *Érpét. génér.* T. 5 p. 801 wird blos eine einzige *Acontias* (*A. meleagris* von Süd. Africa) aufgeführt." (NNM001001113_106; NB. In the *Érpét. génér.* T. 5 p. 801, only one *Acontias* (*A. meleagris* from South Africa) is recorded). Logically Müller must have added this NB after 1839, the publication date of Duméril and Bibron's fifth volume, more than a decade after he wrote his description at Lobo Bay.

The confusion is increased when Müller brings a second genus into play in his preliminary remarks on *Acontias*, on the same page: "*Dhaewolo* (Ww) = slang / *Java* / *Acontias* und die *Caeciliae* werden hier *Doewal* genannt. Es sind dumme unbehülfliche Thiere die gleich den Würmern in der Erde leben und sich im Herausgraben äusserst träge zeigen." (*Dhaewolo* (Ww) = snake / *Java* / *Acontias* and the *Caeciliae* are called *Doewal* here. They are stupid, clumsy animals that live in the earth like worms and are extremely sluggish when digging themselves out).

Caecilians are present on Java, and it is possible that Müller had seen them at the beginning of the expedition, during the 19 months the expedition spent there. It is unclear what Müller is referring to here under the vernacular name of "*Dhaewolo*", Javan caecilians or the New Guinea snakes.

Duméril and Bibron (1839), to whom Müller referred, re-described *Acontias meleagris* Cuvier and explained that the genus name went back to the Hellenized Syrian Lucian, who compared the skink to a throwing spear (Latin *jaculus*).²¹

However, the first species that Müller collected and referred to *Acontias* (*Acontias polygrammicus*) is a typhlopoid snake, not a lizard. The genus *Typhlops*, meaning "blind-eyed" (τυφλος + οψ, typhlos + ops), was created by Oppel (1811)²² for two species of snake that Linnaeus had assigned to *Anguis* (along with *meleagris*), but at the time of the Commissie's expedition to New Guinea, the distinction between *Acontias* and *Typhlops* was unclear. Cuvier (1816) recognised them as similar (*Acontias* on p. 60, *Typhlops* on p. 62), but Merrem (1820) treated them as very distant from each other: *Acontias* was covered on p. 80 as part of his *Repentia*, while *Typhlops* did not appear until p. 158, immediately before *Amphisbaena* in the *Serpentia*, and Fitzinger (1826) only recognised *Typhlops*. The summary of Boie's "*Erpétologie de Java*" by Schlegel (1827) similarly

only lists *Typhlops*, but includes the cryptic note “*Acontias lineatus* Reinw. ist von Boie nie unter *Acont.* gesetzt worden, wie es Hr. Fitz. anmerkt (column 291; *Acontias lineatus* Reinwardt was never placed under *Acontias* by Boie, as Mr. Fitzinger notes). We can find no reference to *Acontias* associated with Boie, and Fitzinger (1826:54) only mentions *Acontias lineatus* Reinwardt as a synonym of *Typhlops lineatus*, which name Fitzinger claims as his own.

Pieter van Oort's drawing (Fig. 11) still bears both names, *Acontias* and *Typhlops*, probably written by Schlegel himself, while in van Oort's list of drawings (NNM001001115) “*Acontias polygrammicus* Müll” seems to indicate that he must have considered Müller as describer. Müller's assignment of his *polygrammicus* to *Acontias* was immediately recognised as erroneous by Schlegel, who noted in his “*Essai*” (1837a part 1:242) that Müller had detected some spectacular reptiles, among them “un *Acontias* presque aveugle, un *Typhlops* à formes disparates” (242; an almost blind *Acontias*, a disparately shaped *Typhlops*).

Just a few years later, Schlegel provided the first significant revision of the genus *Typhlops* in his “*Abbildungen*”²³. After addressing eight American, European, and African species he describes seven Asiatic ones, which he examined in the Paris and Leiden Museums. Six of the Asian species were collected by members of the First and Second Natuurkundige Commissies: *T. Diardii*, discovered by Diard in Cochinchina (historical exonym for parts of Vietnam), *T. Mülleri*, discovered by Müller on Java, *T. lineatus*, discovered by Reinwardt, and *T. ater*, observed in the interior of Java again by Müller, along with *T. polygrammicus* and *T. multilineatus*. He adds that the name *Typhlops polygrammicus* originates from “Müller, der die Art auf Timor entdeckte” (Schlegel 1839a:40; Müller, who discovered the species on Timor). At first glance, this seems to be contradictory. In Müller's handwritten description he specifies “Lobo” as location for his *polygrammicus* (see below), and in his “Catalog” (NNM001001423) as well as in the “Catalogus” shipment-list (NNM001001436_004) he gives New Guinea as the country of origin. However, Müller also records one specimen under “Reptilien van Timor” in his “Verzending M” shipment-list (NNM001001437_002; reptiles from Timor), and it is this that resolves the discrepancy. Schlegel assigned Müller's specimens from Timor and Lobo Bay to different species. Schlegel formally named the Timor species as *Typhlops polygrammicus*, while the specimen from Lobo Bay became one of the types of his *Typhlops multilineatus* (a second specimen is present in the Paris collection). The Lobo Bay specimen can no longer be identified in the Leiden collection (Brongersma 1934), while the specimen in Paris (MNHN RA.1067), collected by Quoy and Gaimard from Dorei, where they collected during the first *Astrolabe* expedition between 28 August and 6 September 1827 (Duyker 2014), has been incorrectly identified as the holotype (e.g., McDowell 1974; Wallach et al. 2014).

Indeed, assuming Schlegel's measurements are in centimetres, the lengths given for $(0,35 + 0,02)$ *A. multilineatus* in his “*Abbildungen*” $(0,35 + 0,02)$ would almost precisely cor-

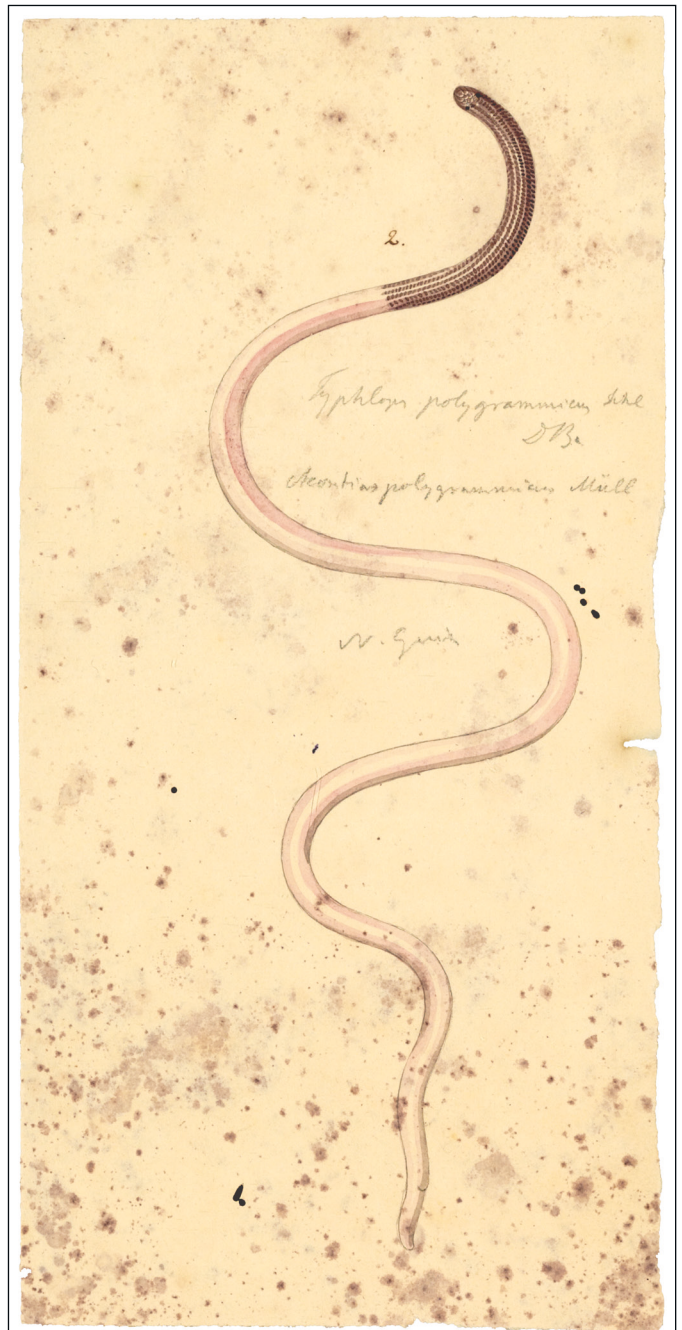


Fig. 11. The inscription, which was definitely added later, most probably by Schlegel, reads as follows: “*Typhlops polygrammicus* Schl[egel]. DB”. And right underneath: “*Acontias polygrammicus* Müll”, with the location given “N. Guin.” (New Guinea) (NNM001000710).

A second quite parallel illustration (NNM001000637_002), not reproduced here, records, most likely from Müller's hand: “*Diese Figur 5 ist hier nur zum Teil fertig. Das übrige muß also vollendet werden; der Zeichner kann zugleich die Stellung des Hintertheiles verändern, wie es mit Bleistift angegeben ist. N. Guinée / B. Lobo*” (This figure 5 is only partially finished here. The rest must therefore be completed; the draftsman can at the same time change the position of the hindquarters, as indicated in pencil. N. Guinée B. / Lobo).

MÜLLER'S MANUSCRIPT IN TRANSCRIPTION AND ENGLISH TRANSLATION

(Gassó et al. 2020: NNM001001113_107)

Acontias polygrammicus Müll.*Lobo. August*
*1828.**Von dieser niedlichen Species erhielten wir nur ein einziges Exemplar.**Seine Länge beträgt 12" 9''' [= 345 mm]; die Dicke des Körpers in der Mitte gemessen 2 1/3''' [= 5.3 mm]; Schz. [= Schwanz] kurz nicht unterschieden mit stumpfer Spitze, auf welcher jedoch noch eine kleine Nadelspitzenähnliche Vorrangung steht, im Ganzen [= above the line] lang 4 1/4''' [= 9.6 mm], Alle Schuppen des Körpers von gleicher Größe, klein, rundlich [= above the line] u. glatt. Kopfklein, garnicht unterschieden, Schnauze abgerundet [= above the line], etwas hervorspringend; Augen, klein rundlich. — Alle obern Theile sind auf grauröthlichem Grunde braunschwartzlich [= above the line] linirt; die untern Seite des Körpers hat eine ähnliche aber viel bläßere Zeichnung. —*

Of this cute species we received only one specimen.

Its length is 345 mm; the thickness of the body measured in the middle 5.3 mm; tail short not distinguished with blunt tip, on which is however a small needle-tip-like protuberance, in total long 9.6 mm. All scales of the body of the same size, small, roundish and smooth. Head small, not at all differentiated, snout rounded, somewhat protruding; eyes small, roundish. — All upper parts on grey-reddish ground brown-blackish lined; the lower side of the body has a similar but much paler pattern. —

respond to Müller's measurement of the Lobo *A. polygrammicus*: 12" 9''' [= 34.5 cm] (see below).

In the New Guinea "Catalog" (NNM001001423) Müller lists one specimen of *Acontias polygrammicus* and *A. coecus* each. Schlegel corrects the names in pencil: in the first case "Typhl. multilineatus" and in the second "Acont. subcoecus".

Schlegel's concept of *Typhlops* has recently been revised in several studies, and his species *multilineatus* (Müller's *polygrammicus* from Lobo Bay) is now in the genus *Ramphotyphlops*, while Schlegel's *polygrammicus*, from Timor, is now in the genus *Sundatyphlops* (Pyrón and Wallach 2014; Hedges et al. 2014), with the first name based on the Greek noun ραμφος (ramphos), meaning curved beak, and the second based on the Sunda archipelago, home of Schlegel's *polygrammicus*. In contrast to the following species, *A. coecus*, whose eyes are not "sichtbar" (visible), Müller refers to the existence of eyes here: "Augen, klein, rundlich" (eyes small, roundish).

The very short blunt tail terminating in a small thorn-like spine is a characteristic feature of typhlopoid snakes. Müller's reference to dark lines along the upper surface of the body, also visible in van Oort's illustration when viewed with sufficient magnification, is the basis for Müller's name for the species: poly-grammicus = consisting of many lines (γραμμικός/grammikos). However, it is likely the presence of these longitudinal markings in both the Lobo Bay specimen and the Timor specimens led Müller to confuse two species, now placed in different typhlopoid genera, as the same species. Schlegel's name, *multilineatus*, refers to the same feature.

DIBAMIDAE

ACONTIAS COECUS CUVIER*(TYPHLOSAURUS CAECUS* (CUVIER 1816 ["1817"]) =
DIBAMUS NOVAEGUINEAE DUMÉRIL AND BIBRON 1839)

Acontias coecus is the second species caught and described by Müller that he assigned to this genus, and also poses major problems in terms of taxonomic assignment. Müller refers in the heading of his text to Cuvier's first edition of his "*Règne Animal*", in which Cuvier pointed out various criteria that differentiated it from the subgenera *Ophisaurus* and *Anguis*: it no longer had a pelvis, sternum, scapula or clavicle (Cuvier 1816 ["1817"]:60). On the same page, after the species *Anguis meleagris*, a species described by Linnaeus with the type locality "Indiis" (in error), for which Cuvier—in error as well—gives the locality Guyana, and to which both Cuvier and Linnaeus refer an illustration in Seba (1735:II, XXI, I. (2)), he briefly mentions another, completely blind species from the Orient: *ac. caecus*. Cuv.

Through Macklot's inventory of Boie's belongings (NNM001001400, see Jacobs and Shea 2022:52) we know that the members of the Commission had access to Cuvier's "*Thierreich*" in five volumes, i.e. the German translation of the "*Règne Animal*", in their book collection of about 240 volumes. The Commission also received in the bequest of van Hasselt a copy of Cuvier's original French edition (NNM001001213). The German translation would have been the 1821–1825 translation by Schinz of the first French edition, which removed the ligature from Cuvier's original name for the species, and spells it clearly as *coecus*. However, the Schinz German edition refers to *coecus* on p. 101, while it is the original French edition that refers to *caecus* on p. 60, the page cited in the annotation

on Müller's description. We are unable to determine whether Müller was using the French edition while at Lobo Bay, or (as with *Acontias polygrammicus*), the bibliographic reference was added by Müller after the expedition returned to Europe.

Cuvier refers to *Acontias caecus* again in the second volume of his opus maius thirteen years later when he correctly calls the Cape of Good Hope home of these “entièrement aveugle (*Ac. caecus*, Cuv.)” skinks (Cuvier, second edition, 1829:70; completely blind). And, indeed, the Latin adjective “caecus”—“coecus” is a misspelling—means blind.²⁴ Cuvier's description, brief as it is, is sufficient to name the species, now known as *Typhlosaurus caecus*, and assigned to the Scincidae.

Quite obviously Cuvier's species cannot be identical with the one Müller found on New Guinea, where no blind or limbless skinks occur. Instead, Müller's specimens were the first collected representatives of a new family of lizards, the Dibamidae, with Duméril and Bibron (1839) describing the new genus and species *Dibamus Novae-Guineae*, using two of Müller's specimens that had been donated to Paris from the Leiden collection, where they bore the name *Acontias subcaecus* (Duméril and Bibron 1839:835).²⁵

On this basis it has to be assumed that Müller erroneously adopted Cuvier's name *Acontias coecus*, probably misled by the general likeness of his own species to the only completely blind reptile previously reported, but later changed his mind, using the modified name *subcaecus* to indicate an affinity with Cuvier's species, but not identity with it.

While *Dibamus Novae-Guineae* was described as having “deux petits membres postérieurs” (Duméril and Bibron

1839:834; two small hind limbs) right under the tail, Müller did not mention limbs, and assigned his species to *Acontias*, a genus that was described as lacking any limbs. This character is sexually dimorphic in *Dibamus*, with the flap-like limbs only present in males (Greer 1985), so if Müller examined a female specimen for his description, the limbs would not have been present.

Quite evidently Müller considered *A. coecus* to be something different from his *A. polygrammicus*, although the first sentence in his description seems to imply some doubt: “Für diese Art halte ich wenigstens ein Thier dieser Gattung” (For this species I consider at least one animal of this genus). Does Müller here refer to the six specimens he mentioned in his “Catalogus” shipment-list of February 1831 “van Nieuw=Guinea” (NNM001001436_004), or the one specimen of *A. coecus* in the undated “Catalog” (NNM001001423_001)? Does he insinuate that he considers one to be *A. coecus* while he is not sure about the others?

We presume six specimens is correct, as six specimens attributable to the Commissie can be located. Two were sent to Paris prior to 1839, becoming the types of *Dibamus novae-guineae*. Four other Müller specimens still in Naturalis, Leiden (RMNH 3635–36, each number representing two specimens; Greer 1985) without any more precise locality than New Guinea, are likely to represent the other four specimens.

No image of this species is identified among the artwork from the Second Commissie in the online-archive, and van Oort does not list the species among list of drawings (NNM001001115).

MÜLLER'S MANUSCRIPT IN TRANSCRIPTION AND ENGLISH TRANSLATION

(Gassó et al. 2020: NNM001001113_108)

Neu=Guinea (B: Lobo)

July & August —

1828

Acontias coecus Cuv[ier].

Cuv[ier]. Rég[ne]. anim[al].: II. pag. 60.

Für diese Art halte ich wenigstens ein Thier dieser Gattung, welches man an dunklen, feuchten Stellen, im Urwalde von Lobo, nicht selten antrifft.

Im Verhältniß anderer Geschlechtsverwandten kurz und dick.

Gz. Lg. [= Ganze Länge] mit Schz. [above the line, Schwanz] 6" 5''' [= 174 mm]; Schz. [= Schwanz] kaum unterschieden, sehr stumpf u. 7 ½''' [= 17.0 mm] lang. Kopf hinten etwas dick aufgeworfen, aber nach vorne zu schnell dünner werdend; Schnauze stumpfspitzig; durchaus keine Augen sichtbar; Schnauzenschild groß, in welchem die sehr kleinen rundlichen Nasenlöcher liegen; Schuppen klein, rundlich, glatt [above the line] und fast überall von gleicher Größe; nur an Kehle wenig kleiner u. unter der Schnauze mehr breitlich. Die Farbe des Rückens ist im Ganzen etwas dunkler als die der untern Theile; alle Schuppen sind in der Mitte gräulichbraun u. an den Rändern dunkler eingefärbt. —

For this species I consider at least one animal of this genus, which is not seldom found in dark, damp places in the jungle of Lobo.

In relation to other genus-relatives short and thick.

Whole length with tail 174 mm; tail hardly distinguished, very blunt and 17.0 mm long. Head somewhat thickly flared behind, but rapidly thinning towards the front; snout bluntly pointed; no eyes at all visible; snout shield large, in which the very small roundish nostrils lie; scales small, roundish, smooth and almost everywhere of the same size; only at the throat a little smaller and under the snout more broadish. The colour of the back is on the whole somewhat darker than that of the lower parts; all scales are greyish brown in the middle and darker fringed at the edges. —

AGAMIDAE

CALOTES MEGAPOGON MÜLL. (= *HYPASILURUS*
MEGAPOGON (DUMÉRIL AND BIBRON 1837))

Only a few specimens of *Calotes megapogon* were available to Müller for his description and presumably (the drawing is not signed) to van Oort for his drawing.²⁶ In the probably earliest list (“Catalog”, NNM001001423), made on New Guinea, two specimens are recorded, under the generic name “*Corythophanes*” (i.e., *Corythophanes*, the Neotropical helmeted basilisks of the family Corytophanidae, a generic name created by Boie for his “*Erpétologie de Java*” and published by Schlegel 1826). This was corrected by Müller who crossed out *Corythophanes* and replaced it with *Calotes*. In combination with Müller’s introductory note in his manuscript description (below), this dates the otherwise undated “Catalog” as written, or at least commenced, prior to the description. In the later “Catalogus”-list of February 1831 (NNM001001436_003), written over two years after the return from New Guinea to Buitenzorg, only one specimen appears with the name “*Calotes megapogon*”.

Müller added to the drawing (NNM001000690; Fig. 12) the title “*Calotes megapogon* Müll.”, the location “Nova=Guinea (Lobo) 1828”, and also, in pencil above the name: “sind ungemein groß [Membran? (illegible)], dann Zeichnung / undeutlich, olivengrün und braun variirt” (are immensely large [membrane? (illegible)], then pattern / indistinct, olive green and brown varied) and noted in the corner “ad vivum” (after life). This is clearly in reference to the dewlap, to which the epithet “megapogon” refers (from the Greek πώγων (pogon) = beard). Of two specimens in the Naturalis collection in Leiden noted in the register as collected by Müller and Macklot, RMNH.RENA.3049 better fits Müller’s description and is likely to be the basis for the description, while RMNH.RENA.3048, with the distinctive pattern on its gular pouch, is the template which van Oort used for his drawing (Denzler and Dondorp 2023, fig. 2:35).

To Müller’s handwritten description, Schlegel added later the species name “*Lophyrus* (!) *dilophus*” with a reference to the “*Erpétologie Générale*” by Duméril and Bibron (1837:419–421) and the statement that “mein Name melapogon [sic] [ist] ebenfalls erwähnt” (NNM001001113_062; my name melapogon [sic] [is] also mentioned). Duméril and Bibron list that name (“SYNONYMIE. *Calotes megapogon*. Mus. de Leyde.”) when describing *Lophyrus dilophus*, mentioning the name again at the end of their description: “Dans le musée de Leyde elle porte le nom de *Calotes megapogon*” (Duméril and Bibron 1837:421; In the Leiden Museum it bears the name *Calotes megapogon*). However, the specimen in Paris (MNHN-RA 2561) is called “*Lophyrus dilophus*. Nobis” by the two zoologists, and provides the basis for their description. Their description also includes a reference to “Planche 46, *Tiaris*”—this is a reference to the Atlas that accompanied their nine-volume work.

Duméril and Bibron (1837:421) explain that they originally intended to establish a new genus with this name, but later decided against it. This suggests that the illustration in question, using the name *Tiaris*, had already been printed, which would have made later changes difficult (Denzler and Manthey 2016). As the Atlas volume bears a publication year of 1854 on its cover page, this rather large time difference is surprising. However, as was often practised in those days, the plates were printed in advance and distributed a few at a time. In the case of the “*Erpétologie Générale*”, the plates were issued in sets of 12 to accompany or precede the text volumes (Bour 2012).

This explains how Gray (1845:239) was able to use the name *Tiaris megapogon*, attributing the name to Schlegel (with *T. dilophus* in its synonymy) nine years before the atlas volume by Duméril and Bibron was completed and a title page issued, referring to both the text of *Lophyrus dilophus* and the plate with its illustration labelled *Tiaris dilophus*. Gray’s description of both the ground colour “reddish brown, brown spotted” and the spiny crest “crest of the tail height like that of the back”, however, refers to the Paris specimen of Duméril and Bibron, which Gray confirms by adding “(from the plate)”, rather than Müller’s specimens in Leiden, although he does refer to the one specimen in Paris and two in the Leiden Museum at the end of his description. Plate 46 was, according to Bour, published together with volume 3 in 1836, the year before the volume containing the text description was published, so that Gray certainly had access to this picture prior to compiling his “*Catalogue*” (Wolfgang Denzler, pers. comm., 4 April 2022).

Constant Duméril also lists both name variants in the later “*Catalogue Methodique*” of the Paris herpetological collection, published together with his son Auguste (Duméril and Duméril 1851) and also names the two naturalist-surgeons “Quoi et Gaimard” (Jean René Constant Quoy and Joseph Paul Gaimard) as collectors of the “TYPE” of *dilophus* (1851:92).

Schlegel (1839b:81) rejected the generic name *Lophyrus*, first created by Duméril (1805), and instead assigned “diese Thiere zu den *Galeoten*” (these animals to the *Galeotes*). The species he described in detail as *Galeotes lophyrus*²⁷, with synonyms *Agama gigantea* (Kuhl 1820) and *Lophyrus tigrinus* (Duméril and Bibron 1837) is today called *Gonocephalus chamaeleontinus* (Laurenti 1768).²⁸ Schlegel did not publish a name for Müller’s species.

Schlegel’s handwritten correction of Müller’s name in this context suggests that he knew Duméril and Bibron’s text but not the corresponding illustration, otherwise, we have to assume, he would not have made the erroneous correction of Müller’s original name *Calotes megapogon* to Duméril and Bibron’s *dilophus* (now *Lophosaurus dilophus*, fide Denzler and Manthey 2016).

In the wider geographical area of New Guinea, 15 *Hypsilurus* species are recognised (Denzler and Manthey 2016:103; Denzler et al. 2020; Denzler and Dondorp 2023).



Fig. 12. *Calotes megapogon* Müll. (NNM001000690). Although the sheet is not signed, we may assume that van Oort was the artist. On the rear of the drawing the name *Bronchocela cristatella* is inscribed, although this identification is incorrect. The connection between the New Guinea agamid and latter species, a quite different looking lizard described by Kuhl in 1820, with a wide geographic range in Southeast Asia that excludes New Guinea, is not explained.

For many years, the species named *Calotes megapogon* by Müller and illustrated by van Oort was known as *Hypsilurus auritus*, first described by Meyer (1874). Meyer compared his species with a second new species he described, *Hypsilurus binotatus* sp. n. from the island of Jobi, which is “viel kleiner”, while the species from New Guinea has “je ein schwarzer Fleck, welcher das Ohr mit einschliesst” on the sides of the head (Meyer 1874: 130, much smaller; one black spot each, which includes the ear). This spot, “bordered by a reddish-brown streak”, is also referred to by de Rooij: it “extends to below the eye; sometimes the black spot is broken up into smaller ones” (de Rooij 1915:115), and can also be seen in van Oort’s drawing.

In two recent papers the nomenclature of this species has been re-evaluated. Firstly, Denzer et al. (2020) reassessed the identity of a species described by Duméril and Duméril (1851) as *Lophyrus spinosus* from the Philippines, which Denzer et al. reidentified as a *Hypsilurus* species similar to *H. auritus*. From the route of the French voyage on which it was collected, the expedition of the ships *L’Astrolabe* and *La*

Zélée commanded by Dumont d’Urville, they proposed that the correct locality for the holotype of *spinosus* was the site of Fort du Bus in Lobo Bay, a locality visited by that expedition in April 1839 long after the departure of the Natuurkundige Commissie from that settlement. Secondly, Denzer and Dondorp (2023) noted that the name *Calotes megapogon* as published by Duméril and Bibron (1837) was not initially an available name in zoological nomenclature because it had been published as a synonym of *Lophyrus dilophus*. Instead, the use of the name *Tiaris megapogon* by Gray (1845), citing the first appearance of the name by Duméril and Bibron (1837), validated that nomenclature. Further, they considered that all three names, *Tiaris megapogon*, *Lophyrus spinosus* and *Hypsilurus auratus*, applied to the same species, and hence restored the long-overlooked name *megapogon* to that species. Thus, in *Hypsilurus megapogon*, we have one of the few species epithets coined by Müller that remains applied to the same species at the present time, though one which has only recently been restored.

MÜLLER'S MANUSCRIPT IN TRANSCRIPTION AND ENGLISH TRANSLATION

(Gassó et al. 2020: NNM001001113_062)

Calotes megapogon Müll.

Neu-Guinea (Baý Lobo) August 1828

[added above the name, different hand] *Lophyrus* (!) *dilophus* Dum. & Bibr. durch Quoy & Gaim[ard]. von N. Guinea. In der *Erp.génér.* 4 p. 419 mein Name *melapogon* [sic!] ebenfalls erwähnt. — Pl. 46, *Tiaris*.

Ich habe diese Species früher auf N: Guinea durch Verwechslung der Geschlechtsnamen fälschlich zur Gattung *Corytophanes* Boie gestellt. —

Gz. Lg. [= Ganze Länge] v. der Schnauzenspitze bis zum After 5" 2''' [= 181 mm], Schwz. [= Schwanz] 1' 3' = " 8''' [= 424 mm] Kopf lang 1" 3 ½''' [= 35 mm] hinten breit 8 ½''' [= 19 mm] hoch über der Stirn 8''' [= 1.8 cm] Totalform im Wesentlichen ganz wie *Cal. gutturosa*. Kopfrundlich, oval mit stumpfer Schnauze, doch von der Seite gesehen von der Stirn herab stark abschüssig; Augen mittelmäßig; mit kantigen Supracilien, welche dunkel, fast schwärz [lich, = above the line] bis zu der Schnauze herab zieht; die kleinen runden Nasenlöcher liegen unter dieser feinsten u. nur 2''' [= 4.5 mm] von der Schnauzenspitze entfernt. Augenlieder mit kleinen körnigen Schüppchen bedeckt; oberes u. unteres Rüßelschild kurz aber breit; an jeder Seite u. jeder Kinnlade 9 Lippenschilder. — Kamm im Nacken weniger hoch als bei *gutturosa*, aber ganz auf dieselbe Art gebildet, u. sich auch wie bei dieser Art allmählich in der Schnz. [= Schnauze] verlierend. Kehlsack sehr groß, lang 1" 3 ½''' [= 35 mm] breit (an seiner Basis gemessen) 1" 10''' [= 77 mm]. Die Schuppen des Kopfes, Rückens u. der Basis des Schwz. [= Schwanzes] sind äußerst klein u. carinirt [= keeled], wodurch sie ein grobkörniges Ansehen erhalten; auf den Extremitäten der obern Seite des Schwz. [= Schwanzes, above the line] dem ganzen unteren Theil des Körpers mit Ausnahme des Kehlsackes [crossed out]. Die Schuppen etwas größer aber ebenfalls stark carinirt [= keeled]; auf der unteren Seite des Schwz. [= Schwanzes] sind jedoch die Schuppen doppelt so groß als auf dem Bauch u. ihre großen Kiele bilden daselbst mehrere Längsstreifen. Kehlsack wie der ganze Hals grobkörnig geschuppt. Kopf, Rücken u. außen Seite der Extremitäten frisch grasgrün; auf dem Rücken u. den Extremitäten mehrere undeutliche bläuliche Querstreifen u. unterer noch

_063
schwärzlich marmorirt; auch auf dem Kopf bemerkt man schwarze Punkte u. roströthliche Schattirungen; Hals bläulichgrün, mit mehreren von der Nackenleiste schräg nach vorne zu laufende gelbliche Streifen; ein ähnlich gefärbter Streif zieht sich auch unter dem Aug hin, hinter dem ziemlich großes Tympanum herum; Kehlsack blaß kornblumenblau mit schwarz gefleckter Schattirung; die Grundfarbe der Basishälfte des Schwz. [= Schwanzes] ist bei einem stark [above the line] bläulichen Anstrich braunlichgrau, u. vorne röthlich graubraun; doch über den ganzen Schwz. [= Schwanz] zeigen sich 7 breite [above the line] schwarze Ringe, die von der Basis nach der Spitze des Schwz. [= Schwanzes] zu an Breite allmählich [above the line] zunehmen; Unterleib braulich grün, aber auch grasgrün, nach Willkühr des Thiers.

Einzel im hohen Wald von Lobo. Die Inländer nennen diesen *Calotes Bessabasa*.

I previously placed this species incorrectly in the genus *Corytophanes* Boie on N: Guinea by confusing the genus names. —

Whole length from tip of snout to cloaca 181 mm, tail 424 mm, head length 35 mm, breadth behind 19 mm, height above forehead 18 mm, total form essentially quite like *Cal. gutturosa*. Head roundish, oval with blunt muzzle, but seen from the side strongly sloping down from the forehead; eyes medium; with angular supraciliaries, which are dark, almost blackish, descending to the muzzle; the small round nostrils lie below this finest and only 4.5 mm from the tip of the muzzle. Eyelids covered with small granular scales; upper and lower rostral shields short but broad; on each side and on each jaw 9 labialia. — The nape of the neck may be less high than that of *gutturosa*, but formed in the same way, and gradually fading in the snout. Dewlap very large, length 35 mm, width at its base 77 mm. The scales of the head, back and base of the tail are extremely small and keeled, giving them a coarse-grained appearance; on the extremities of the upper side of the tail, the entire lower part of the body with the exception of the dewlap. The scales somewhat larger but also strongly keeled; on the lower side of the tail, however, the scales are twice as large as on the belly and their large keels form several longitudinal stripes there. Dewlap, like the whole neck, with coarse scales. Head, back and outer side of the extremities fresh grass-green; on the back and the extremities several indistinct bluish transverse stripes and lower, still blackish marbled; also on the head one notices black dots and rust reddish shades; neck bluish-green, with several stripes running from the nape of the neck diagonally towards the front; a similarly coloured stripe is also visible under the eye, rearwards a rather large tympanum; throat pouch pale cornflower-blue with black spotted shading; the basic colour of the base half of the tail is brownish-grey with a strong bluish tinge and reddish-greyish-brown in front. However, over the whole tail there are 7 broad black rings, which increase in width from the base towards the tip of the tail. Abdomen brownish green, but also grass-green, at the discretion of the animal.

Solitary in the high woods of Lobo. The locals call this *Calotes Bessabasa*.

When Müller uses “*Cal. gutturosa*” as a comparison in his description, it is not certain to which specimens exactly he is referring, although he was aware of a species identified by that name, as the name *gutturosus* appears does elsewhere in Müller’s manuscripts. Concerning “*Calotes gutturosus & cristatellus*” from Java, Müller not only observes that “des Nachts lässt es einige pfeifende Töne hören” but points out that the “welkührliche Färbveränderung der Caloten (...) bereits hinreichend bekannt [sei]” (NNM001001113_061, at night it lets out some whistling sounds; the arbitrary change in the colour of the *Calotes* is already sufficiently known). He claims that they can change their colour but only from their generally “graues Kleid, das bei der Gefangennehmung zugleich in ein etwas schmutziges Braunes übergeht” (grey dress, which immediately changes to a somewhat dirty brown when captured).

The name *gutturosa* does not appear in any of the transport lists, but it does appear in the list of 1826 compiled by Schlegel after that shipment’s arrival in Leiden; there, the only specimen is listed immediately below the name “*Calotes cristatella*” (NNM001001048) attributed to Kuhl, a species that he had described in 1820 as “*Agama cristatella mihi*”.²⁹ Van Oort does not mention either species in his list of drawings (NNM001001115).

We know that Müller and his colleagues had not only prepared themselves very well for this expedition, but that they had seen all of Kuhl’s and van Hasselt’s documents and notes handed over by van Raalten (see Jacobs and Shea 2022:52). Most certainly the group also had with them at least the illustrations from Boie’s “*Erpétologie de Java*”, where the name *gutturosa* appears on plate XI (Naturalis, Leiden, archive) attributed to Merrem, the illustration drawn by Antoine Maurevert.³⁰ The species had first been described by Merrem (1819), based on two illustrations from Seba (1734), but it is more likely that Boie would have been more familiar with the redescription by Merrem (1820), where the species stated as being from “America meridionali et in Mexico?” (South America and Mexico) indicating Merrem’s doubt with regard to the distribution given by Seba with a question mark. The name *Agama gutturosa* Merrem is now considered either a synonym of Kuhl’s *Agama cristatella* (Figueroa 2021) or a senior synonym of Duméril and Bibron’s (1837) *Bronchocela jubata* (Denzer and Tillack 2024), both species occurring in Java. We may assume from Müller’s notes from Java (above) that he had become familiar with these species during the nineteen months that the Commissie spent on Java before he landed on New Guinea (Wolfgang Denzer, pers. comm., 5 April 2022), or that he had seen *B. cristatella* on Ambon, during the three weeks that the expedition spent there before leaving for New Guinea. According to one shipment-list, the “Catalogus” (NNM001001436_004) of February 1831, 20 specimens of *Agama cristatella* (now *Bronchocela cristatella*) had been acquired on Amboine. The second shipment-list of February 1831, the “Verzending M” (NNM001001437_002) documents 16 *Calotes cristatella*

Kuhl “van Amboina”. At the moment, neither the relationship between the two lists nor why Müller used two different generic names can be clarified.

VARANIDAE

VARANUS PRASINUS MÜLL.

(= *VARANUS PRASINUS* SCHLEGEL 1839B)

In Müller’s handwritten notes, the genus *Varanus* is rarely mentioned; apart from *V. prasinus*, only *V. bivittatus* Kuhl (now *Varanus salvator bivittatus* Kuhl 1820), of which one specimen was caught on Java, is described to some extent (NNM001001113_119–120). Of a third species, *V. elegans* Merr. (now *V. salvator salvator* (Laurenti 1768), although specimens from Timor, Samao and Ambon would now be *V. timorensis* Gray 1831 and *V. indicus* Daudin 1802; Kaiser et al. 2011; Weijola 2015), four specimens were shipped to Leiden, one each from Timor and Amboina and two in a “blikken doozen” (tin box) from “Timor en Samao” (NNM001001437_002). Neither description nor drawing of these could be found. Van Oort did not enter either name in his list of drawings (NNM001001115); the only monitor that appears is *V. prasinus* (Fig. 13).

In Schlegel’s description (1839b:78–79) the origin is described as “West-Küste Neu-Guinea’s” (West coast of New Guinea), but Müller’s name priority is not mentioned.

Since this species has already been studied in detail in a separate paper (Jacobs and Koch 2021), we limit ourselves here to a reference to that work.

GEKKONIDAE

HEMIDACTYLUS BALIATUS MÜLL. (= *GEHYRA SERRICAUDA* SKIPWITH AND OLIVER 2014)

The first of two gecko species reported in Müller’s manuscripts from Lobo Bay is a species he named *Hemidactylus baliatus*, comparing it with *Hemidactylus frenatus*, a species first collected on Java that had been named by Kuhl and van Hasselt, and also later by Boie. Their manuscript descriptions of *H. frenatus* were never published, though the name was listed by Schlegel (1826:235, 1827:column 290,) in his summaries of Boie’s “*Erpétologie de Java*”, the latter stating “*H. frenatus* K. und v. H. n. sp. [Kuhl and van Hasselt n. sp.]” among the 7 species of *Hemidactylus* that the museum [Leiden] had in its possession. His references to *H. frenatus* must be regarded as *nomina nuda*, as they lack any concrete detail.

A decade later Duméril and Bibron (1836) formally described *Hemidactylus frenatus* from numerous specimens (including some from the Naturalis collection from Leiden sent on exchange to Paris). They attributed the name to Schlegel rather than Boie, and emphasised that their epithet, from the Latin “frenum” (rein or bridle), was the one under which the species had been sent to Paris (Duméril and Bibron 1836:366).



Fig. 13. *Varanus prasinus*. Van Oort's drawing (NNM001000670) constitutes the earliest image of this species, which was produced on site with the freshly caught specimen in hand. By adding the name "Var. prasinus Müll n. sp.", which stemmed from "N. Guinea B. Lobo" and was drawn by "v. Oort del.", Müller claimed this species for himself as the first describer.

Van Oort lists a drawing under the name "*Hemidactylus frenatus* Boie" immediately after "*Hemidactylus baliatus* Müller" (NNM001001115_001). "*Hemidactylus fraenatus*", together with "*Gonyodactylus marmoratus*", was also drawn by van Oort on plate IX in preparation for Boie's "*Erpétologie de Java*" (Naturalis, Leiden, archive) each in a dorsal and a ventral view, while the transport list from February 1831 mentions "*Hemidactylus fraenatus* Müll." with 19 specimens from Amboina (see also Fig. 14). Müller's unpublished, handwritten description of the species (NNM001001113_136), called "Tjaktjak" in the natives' vernacular, however, gives "Java and Sumatra" as the locality, while Schlegel's addition to that manuscript "(wahrscheinlich durch Schiffe angebracht)" (probably brought by ships) mentions among others Ceylon, Madagascar, Amboina, Java, Timor, Marianas, Bengal. As we have noted previously, Boie's descriptions of *H. fraenatus* and *G. marmoratus*, which obviously refer to two different species, must have been known to Müller, which explains Müller's addition to the species name "*Hemidactylus frenatus* Boie".

Obviously with Müller's notes before him, Schlegel provided a short handwritten, unpublished description of "*H. baliatus* n. sp.", again comparing the species with *Hemidactylus frenatus* for comparison (NNM001001387_014), even though the species is half again larger in size than *H. frenatus*. Schlegel mentions as well the "doigts élongés à toute le longueur et a lames sous digitales en chevron" (full-length elongated fingers with chevron-shaped subdigital lamellae). Müller highlights more precisely "Nägel klein aber scharf; Daumen nagellos" (NNM001001113_132, see below; nails small but sharp; the thumbs nailless). Constant and Auguste Duméril underline this aspect as well when they indicate that their species *Hemidactylus baliolus* belongs to the "dactyloperes ou à pouces sans ongles" (Duméril and Duméril 1851:38, dactyloperus with nailless thumbs).

Apparently, Müller succeeded in obtaining only three specimens of *Hemidactylus baliatus* on New Guinea; at least the shipment-lists ("Verzending M", February 1831; NNM001001437_002 and undated "Catalog", NNM001001423) refer to this number. In the "Catalogus" list of February 1831 the species is not mentioned.

MÜLLER'S MANUSCRIPT IN TRANSCRIPTION AND ENGLISH TRANSLATION

(Gassó et al. 2020: (NNM001001113_132)

Hemidactylus baliatus Müll.

Neu=Guinea (Lobo)

August 1828

Länge des Körpers von der Nasenspitze bis zum After 3"4'''
[= 90 mm]; *Länge des Schws.* [= Schwanzes] *2" 6 2/3'''* [= 69
mm], *breit an der Basis 4 1/4'''* [= 9.6 mm], *hoch daselbst*
2 2/3''' [= 6.0 mm]; *Kopf lang 10 1/2'''* [= 24 mm] *hinten breit*
7 1/4''' [= 16 mm], *hoch über der Stirn 2 1/2'''* [= 5.6 mm]. —

Form im allgemeinen wie bey H. fraenatus Boie. y. — Kopf
länglich oval, deprimirt; Occiput flach, aber von der Stirn
nach der Schnauzenspitze zu abschüssig; Augen groß, stark
hervorstehend mit verticulerer Pupille u. ochergelblicher Iris,
die schwärzlich besprengt ist: Nasenlöcher klein, rundlich,
vorne ans Rüsselschild stoßend, u. oben durch ein kleines
Schildchen begrenzt. Schwanz unterschieden breit, deprimirt
scharfkantig. Füße kurz, plump; Zehen stark erweitert; Nägel
klein aber scharf; Daumen nagellos. Oberkinnlade mit 12–
14 Randschildern an jeder Seite und einem breiten scutum
rostrale besetzt; an der Unterkinnlade stehen auf jeder Seite
8–9 Randschilder; ein Lippenschild u. hinter diesen am Kinn
noch 6 kleinere Schildchen. Alle oberen Theile des Körpers
wie auch die Kehle sind mit klein

_133

körnigen Schuppen dicht besetzt; die Schuppen auf der Brust
u. dem Bauche sind ein wenig größer, flacher u. rundlich;
untere Seite des Schwz. [= Schwanzes] *mit kurzen [crossed*
*out] breiten Schildern bedeckt. 34–38 Schenkelöffnungen*³¹.
— *Die Grundfarbe der oberen Theile ist auf graubräunlichem*
Grunde stark dunkel olivengrün überlaufen u. allenthalben
rosth oder auch braunroth punktirt u. gefleckt marmorirt;
auf dem Kopfe stehen mehrere gleichgefärbte unterbrochene
Längsstreifen; u. auf dem Rücken u. Extremitäten bemerkt
man noch einzelne kleine hellere Flecken; alle untern Theile
des Körpers schmutzig bräunlichgelb. —

nb. [different hand, different pen, subsequently inserted, likely
by Schlegel] *Vielleicht gehört zu dieser Art Hemid[actylus].*
variegatus Du. & Bibr. (Erp. génér. T. 3 p. 353) von N[eu].
Holland.

Die Einwohner von Lobo nannten diesen Gecko Wama=Kutu.

Length of body from tip of nose to cloaca 90 mm; length of
tail 69 mm, breadth at the base 96 mm, height there 6.0 mm;
head length 24 mm breadth behind 16 mm, height above the
forehead 56 mm. —

Shape generally as in *H. fraenatus* Boie y. — Head elongated
oval, depressed; occiput flat, but sloping from forehead to
tip of snout; eyes large, strongly protruding with vertical
pupil and ochre-yellowish iris, which is blackish sprinkled:
nostrils small, roundish, abutting the rostral shield in front,
and bordered above by a small shield. Tail distinct, broad,
depressed, sharp-edged. Feet short, clumsy; toes strongly
expanded; nails small but sharp; the thumb nailless. Upper
jaw with 12–14 labial scales on each side and set with a broad
rostral; on the lower jaw there are 8–9 labial shields on each
side; a mental shield and behind these on the chin 6 smaller
shields. All upper parts of the body as well as the throat are
densely covered with small granular scales; the scales on the
chest and abdomen are a little larger, flatter and roundish;
lower side of the tail covered with short, broad scales. 34–38
thigh-openings³¹. — The ground colour of the upper parts is
strongly overlaid with dark olive-green on a grey-brownish
ground, and everywhere rust-red or brown-red grounded and
mottled; on the head there are several interrupted longitudinal
stripes of the same colour; and on the back and extremities
one notices individual small lighter spots; all lower parts of
the body dirty brownish-yellow. —

nb. [different hand, different pen, subsequently inserted,
likely by Schlegel] Perhaps this species includes *Hemid.*
variegatus Du. & Bibr. (Erp. génér. T. 3 p. 353) from N[eu].
Holland.

The inhabitants of Lobo called this gecko Wama=Kutu.



Fig. 14. The caption of the drawing reads: “*Hemidactylus*. *baliatus* Müll. N. Guinea B. Lobo” (NNM001000609). Although the online-archive calls the “Author: Unknown” we may presume that the artist was again Pieter van Oort, due to the similarity in style with his other lizard paintings, even though the caption most probably stems from Schlegel again.

Several “gleichgefärbte unterbrochene Längstreifen” (interrupted longitudinal stripes), as mentioned by Müller, in a rusty red are found on the drawing most distinctively right behind the eyes. This “ligne assez large” extends in “taches confluentes” along the sides of the body (fairly broad line, in confluent spots).

Surprisingly, this gecko, according to Müller, has the same name in vernacular as a village near Lobo (see above NNM001001113_144). Schlegel’s nota-bene addition with its reference to Duméril and Bibron’s “*Érpetologie générale*” insinuates a relationship with a species that those authors ascribed to the west coast of Australia (Baie des Chiens Marins, Shark Bay, about 800 km north of today’s Perth), “N[eu]. Holland.” in Schlegel’s terms. Müller himself assumed kinship with *H. fraenatus* Boie, which we also find in van Oort’s list with its correct spelling without the “a”.

The clawless first digit, and the broad subdigital lamellae with a central notch, along with the illustration by van Oort, indicate that the species named by Müller as *H. baliatus* is not a *Hemidactylus*, but belongs to *Gehyra*, a genus that was not named until John Gray in London created it for a species from Pacific Oceania (Gray 1834b). *Gehyra* is an extremely speciose genus, with nearly 70 species, many of which are primarily distinguished genetically, with only very limited morphological differences. On current taxonomy, the species collected by Müller is most likely *Gehyra serraticauda*, a species only recently described by Skipwith

and Oliver (2014) from a single specimen from Fak Fak. Their description assigns to the same species a specimen photographed from Triton Bay in 2010 that closely resembles van Oort’s illustration. However, Müller’s name *baliatus*, presumably from the Greek βαλιος (*balios*), marbled, alluding to the irregular dorsal patterning, raises a possible taxonomic complication. Duméril and Duméril (1851) named a gecko *Hemidactylus baliolus*, stating (Duméril 1856) their name was derived from a Latin word stemming from Plautus, and meaning red and spotted, basing their description on a single specimen in the Paris collection without any locality other than New Guinea and without any indication of a collector. That name, as *baliola*, has since been assigned to a *Gehyra* species from the Western and Central Provinces of southern Papua New Guinea, distant from Lobo Bay (King et al. 1989). The similarity between Müller’s name *baliatus* and Duméril and Duméril’s *baliolus* raises the possibility that the type of *baliolus* instead may have been a specimen obtained from the Leiden collection bearing a label with Müller’s name on it, the label and association with Leiden subsequently lost, with Duméril and Duméril using a modification of that name.

The Paris collection includes a number of Müller specimens obtained from Leiden, and there have been other occasions when slight misspellings of Müller names were listed in other Duméril publications, for example the listing of Müller's *Scincus erythrolaimus* as *Scincus erythrolamus* by Duméril and Bibron (1839), as noted by Jacobs and Shea (2022). *Gehyra serraticauda* and *Gehyra baliola* are very similar species, attaining similar sizes, with similar mottled red colour patterns, and both with a deeply notched rostral scale, partially divided subdigital lamellae, and a skin fold along the posterior margin of the hind limb. The primary difference between them is the more flattened tail of *G. serraticauda*, bearing a pronounced serration along the ventrolateral margins due to projecting scales (Skipwith and Oliver 2014). However, *G. baliola*, as presently defined, has some flattening of the tail and a non-spinose ridge along the sides of the tail (King et al. 1987). Although a spinose fringe was not mentioned by Duméril and Duméril in describing *baliolus*, the subsequent illustration of the type specimen by Duméril (1856, pl. xxvii, here reproduced as Fig. 15) does appear to show some development of a spinose fringe along the tail in their specimen, of a similar degree of development to the photograph of the specimen from Triton Bay reproduced by Skipwith and Oliver (2014), although the latter individual has the distal part of the tail regenerated, so that the spinose fringe is only visible at the tail base.

Careful re-examination of the holotype of *Hemidactylus baliolus* in Paris is needed to determine whether it is conspecific with the species to which the name has subsequently been applied, or whether it represents the same species as *Gehyra serraticauda*.

***GONYODACTYLUS BOIEI* MÜLL. (= *CYRTODACTYLUS NOVAEGUINEAE* (SCHLEGEL 1844))**

Although a *Gonidactylus Boiei* Mull. (van Oort omits the German umlaut quite often) is recorded in van Oort's list of drawings (NNM001001115), the drawing itself cannot be found in the online-archive. It could well be that Schlegel's illustration of *Gymnodactylus marmoratus* var. *Novae Guineae* (Fig. 16) derives from van Oort's drawing, however, as Müller's description closely matches the published artwork.

It is not only with regard to the epithet that uncertainties prevail; several variant spellings of the genus name also exist. Heinrich Kuhl, working with Johan Conraad van Hasselt, used both "Gonyodactylus" and "Gonydactylus". The former spelling is found in his handwritten notes both on the cover page "*Gonyodactylus* Nobis Kniefingerer", "Genus ex Geckonum", (NNM001001036_201) and on the following page where he describes "*Gonyodactylus fasciatus* Nobis. "Wir erhielten ihn bei Buitenzorg, wo er sehr selten seyn muss. Tjihanjavas u. Aloun Aloun sehr gemein, gehört also den höheren Gegenden an, da er bei Buitenzorg sehr selten ist" (NNM001001036_202; We got it at Buitenzorg,



Fig. 15. *Gehyra baliola* from Duméril (1856, pl. xvii), which Duméril called "Hemidactyle taches-rousses" (red-spotted Hemidactylus) in his caption. There are differences between the drawings in Figs. 14 and 15, not only in the form of the body and tail, but the pattern as well. However, as Müller collected three individuals, it is possible that the two illustrations are of different specimens from the same locality. It is also possible that the highly stylised illustration by Duméril is not an accurate reproduction of the lizard. Image: Biodiversity Heritage Library.

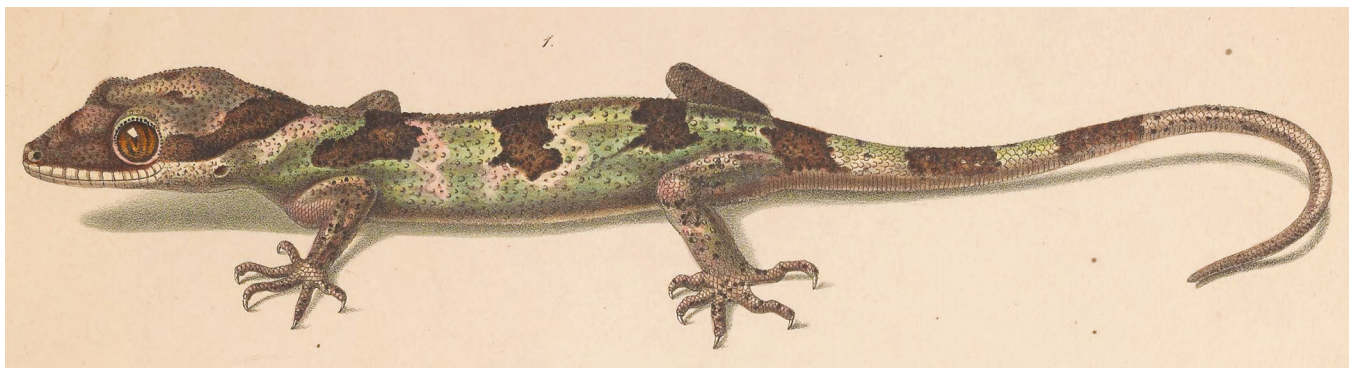


Fig. 16. Illustration of *Gymnodactylus marmoratus* var. *Novae Guineae*, as published by Schlegel (1837b:Plate 2). This illustration is likely to be based on the now-missing painting of *Gonyodactylus Boiei* Müll. by van Oort; the colour features correspond exactly to those described by Müller in his handwritten text, reproduced below.

where it must be very rare. Tjihanjavas u. Aloun Aloun very common, thus belongs to the higher regions, as it is very rare at Buitenzorg).

In a published passage, from “Tjchorjavor am Fuße des Pangerango, d. 18. Juli 1821” (Tjchorjavor at the foot of the Pangerango, July 18, 1821), however, the two use a slightly different spelling: “Ein neues Thier gab uns Gelegenheit ein neues Untergenus — *Gonydactylus* zu bilden (griech., Knie) welches den *Phyllouren* Cuv. am nächsten steht, aber durch Bildung seines Schwanzes sehr abweicht” (Kuhl and van Hasselt 1822b:475; A new animal gave us the opportunity to form a new subgenus — *Gonydactylus* (Greek, knee) which is closest to the *Phyllouren* Cuv. but differs greatly in the formation of its tail). However, this use of the generic name is a nomen nudum (Mees 1987:137), insofar as no species was included in it and thus *Tarentola* Gray 1825 and *Cyrtodactylus* Gray 1827, published just a few years later, remain valid. According to Mees, “the first validation of *Gonydactylus*” with assigned species was found in Schlegel: “Nouveau Genre: GONIODACTYLUS Kuhl. Espèces: *G. marmoratus* Kuhl. N. esp. — Et *Ascalabotes stenodactylus* Licht.” (Schlegel 1826:235; repeated with slightly different wording in 1827:column 290; new genus), and with only *stenodactylus* as an available species name at that time, *Gonydactylus* becomes a junior synonym of *Tarentola* Gray 1825, while the generic name for the south-east Asian species seen by the Commissie members becomes *Cyrtodactylus* Gray 1827.

In the same year, 1826, Schlegel recorded the receipt of one specimen of *Gonyodactylus marmoratus* R[einwardt]. in a transport-list he drew up himself (NNM001001048_001).

This attribution to Reinwardt is surprising, as Müller uses that species as a comparative reference in the text transcribed below but attaches Boie’s name as the author for it. On plate IX intended for Boie’s “*Erpétologie de Java*” there are two illustrations under the name “*Gonyodactylus marmoratus*” (Naturalis Leiden, archive). Another illustration (NNM001000699) bears the name *Gymnodactylus marmoratus*, written by Schlegel. Originally the sheet had been marked “*Gonydactylus fasciatus* Nobis³²— Buitenzorg”

with an “o” subsequently inserted above the line after the “y” and the addition “sÿn. *G. marmoratus* K. u. H” and a reference to the relevant illustrations for Boie’s “*Erpétologie de Java*” (“*Erpét.*, pl 9, f. 3. 4.”).

In his undated handwritten notes Schlegel attributes *Gymnodactylus marmoratus* to Bibron, but remarks at the end that Kuhl had detected this species “rarement a Buitenzorg, mais en abondance sur les hauteurs montagneux ou Fjiliunjavon” (NNM001001387_003; rarely in Buitenzorg, but in abundance on the mountainous heights of Fjiliunjavon) which we read almost verbatim in Kuhl’s notes (see above). However, it would be Gray (1831:51) who published sufficient description to validate the name nomenclaturally, but again attributing the name to Kuhl’s manuscripts (“Marbled Cyrtodactyle. *Marmoratus Gonyodactylus*, Kuhl. MSS”), which he had seen during a visit to Leiden (Mecke et al. 2016).³³

Additional to the one specimen of *Gonyodactylus marmoratus* in Schlegel’s list of April 1826 (NNM001001048_001), Müller mentions in his “Catalogus” shipment-list of 1831 (NNM001001436_003) a specimen of “*Gonyodactylus Boiei* Müll.”, while he registered in his undated “Catalog” of reptiles from New Guinea (NNM001001423) two specimens of “*Gonyodactylus Boiei* Müll.” besides four specimens of “*G. granosus* [sic!] Müll.”, a species that does not turn up either in Müller’s notes nor in other documents. Today’s denomination of this species remains a mystery.³⁴

The nomenclatural complexity continues through the existence of the similarly named *Gonyodactylus Boei* Gray (Gray 1842:58), now known as *Cnemaspis boiei* (Gray 1845). Gray based his description of that species on four specimens collected by Major Hardwicke from India, in the collection of the British Museum in London. No precise locality was provided, and the species has not been subsequently rediscovered (Smith 1935).

MÜLLER'S MANUSCRIPT IN TRANSCRIPTION AND ENGLISH TRANSLATION

(Gassó et al. 2020: (NNM001001113_144)

Gonyodactylus Boiei Müll.

(Bay Lobo) August 1828
Wama=Kutu bey Lobo

Gz. [= Ganze] Länge des Körpers von der Nasenspitze bis zum After 4" 9''' [= 129 mm], des Schzs. [= Schwanzes] 5" 3''' [= 142 mm]; Länge des Kopfes von der Nasenspitze bis zum Tympanum 1" 3''' [= 34 mm], Höhe desselben über der Stirn 6 ¾" [= 15 mm], Vorderfüße mit Zehen 1" 9''' [= 47 mm], Hinterfüße mit Zehen 2" 2 ½" [= 60 mm]. Alle Zehen sind mit kleinen, scharfen Nägeln bewaffnet.

Kopf unterschieden [above the line] groß, dieselbe ovale Form wie bey Gonyodactylus. marmoratus Boie. Auch die Hautbedeckung ist im Wesentlichen dieselbe, wie auch die Gestalt des Rüssels u. der kleinen runden Nasenlöchern, über welchen einige kleine Schildchen stehen, viel Ähnlichkeit haben; oben und unten 13–14 Randschilder auf jeder Seite; ein großer Rüssel= u. Lippenschild. —

Die Schuppen der obern Theile des Körpers u. des Schzs. [= Schwanzes] sind außerordentlich fein, rundlich, höckerig, u. auf dem Nacken, Rücken, dorn obern Basis [= above the line] hoch des Schzs. [= Schwanzes] u. der äußeren Fläche der Extremitäten mit doppelt so großen Höckern untermischt. Längs den Seiten, von den vordern zu den hinteren Extremitäten läuft eine Hautfalte auf welcher diese größeren Höcker als in einer Linie stehen u. somit die Grenze vom Unterleibe bilden; die Schuppen der Kehle sind ebenso klein als die des Oberkopfes und ebenfalls durch größere Höcker untermischt; die Schuppen der Brust, des Bauches u. der inneren Seite der Füße sind [crossed out] alle gleich große, u. größer als jene des Rückens, dabey rundlich u. ziemlich flach. —

Oberer Theil des Leibes schmutzig grünlich hellgrau mit hin u. wieder [above the line] rosenröthlichem Anflug. Von dem hinteren Augenwinkel zieht sich [crossed out] über [above the line] den Nacken eine große schwarze Triangel, u. auf der Mitte des Oberkopfes stehen noch mehrere [crossed out] gleichgefärbte Flecken, welche einen nach vorne zu gerichteten Winkel bilden, außer diesen ziehen sich noch über den Rücken u. Schz. [= Schwanz] 6 bis 7 breite, schwarze Querbinden, die mitunter durch ähnlich gefärbte unregelmäßige Flecken untermischt sind; auch auf der außen Fläche der Extremitäten stehen ähnliche [= crossed out] Schattirungen. —

_145

Ganze untere Seite bräunlichgrau mit bisweilen grünlichem Anstrich. —

Whole length of the body from tip of nose to vent 129 mm, length of the tail 142 mm; length of the head from tip of nose to tympanum 34 mm, height of same above forehead 15 mm, forefeet with toes 47 mm, hindfeet with toes 60 mm. All toes armed with small, sharp nails.

Head distinctly large, same oval shape as *Gonyodactylus marmoratus* Boie. Also the skin covering is essentially the same, as also the shape of the snout and the small round nostrils, above which are some small shields, that are very similar.

Above and below 13–14 labial scales on each side; one large large rostral and mental. —

The scales of the upper parts of the body and the tail are extraordinarily fine, roundish and bumpy, and on the neck, back, the upper base of the tail and the outer surface of the extremities intermixed with double-sized bumps. Along the sides from the front to the rear extremities runs a skin fold on which these larger bumps stand as in a line and thus form the border of the abdomen; the scales of the throat are just as small as those of the upper head and likewise intermixed with larger bumps; the scales of the chest, of the belly and of the inner side of the feet are all of equal size, and larger than those of the back, although roundish and rather flat.

The upper part of the body is a dirty greenish light grey with an occasional pinkish-reddish tinge. From the rear corner of the eye, a large black triangle extends over the nape of the neck, and on the middle of the upper part of the head there are several spots of the same colour, which form an angle directed towards the front. In addition to these, there are 6 to 7 broad, black transverse bands over the back and tail, which are sometimes intermixed with similarly coloured irregular spots; there are also similar shadings on the outer surfaces of the extremities. —

Whole lower side brownish grey, sometimes with a greenish tinge. —

A second description is surprising in that it is, quite unusually for Müller, at least partly written in Latin (NNM001001113_138). Basically, the two texts do not show any significant differences; in both, the central features are

mentioned—partly with almost the same words, such as “rosenröthlich” (rose-reddish) for the hue in some parts on the back.

MÜLLER’S MANUSCRIPT IN TRANSCRIPTION AND ENGLISH TRANSLATION

(Gassó et al. 2020:NNM001001113_138)

Gonyodactylus Boiei

Ziage [indecipherable]: *Capite magno, distincto, naribus parvis, rotundatis,*

[Mit großem, markantem Kopf, kleinen, abgerundeten Nasenlöchern]

+ (*über welchen einige kleine Schildchen stehen*);

cauda longiuscula; scuta marginalia 26 in labii superioris et inferioris; squamis supra trunci caudaeque parvis finis, rotundatis, granulatis

[langer Schwanz; 26 Randschilder an Ober- und Unterlippe; die Schuppen über Rumpf und Schwanz enden klein, abgerundet, gekörnt]

+ (*auf dem Hals, Rücken, der oberen [crossed out] Basishälfte des Schwanzes und der äußern Seite der Extremitäten mit doppelt so großen Höckern untermischt; Längs den Seiten von den vordern zu den hintern Extremitäten zieht sich eine Hautfalte*;

squamis infra corporis parvis subplanis; supra sordide ex virescente glaucus

[kleine Schuppen unter dem Körper; oben schmutzig von grünlich grau]

+ (*mit hin und wieder rosenröthlichem Anflug*) *collo dorsoque fasciis nigris latis transversis 7, (per maculas irregularites / [139] ejusdeae coloris iater mixtis*

[im Nacken und Rücken mit 7 breiten schwarzen Querstreifen, durch unregelmäßige Flecken von gleicher bereits gemischter Farbe]

(*die durch ähnlich gefärbte unregelmäßige Flecken Untermischt sind*.

subtus ex brunescente griseus. —

[Unterseite bräunlich grau]

With a large, distinct head, small, rounded nostrils,

+ (above which there are some small scales);

long tail; 26 labial shields on the upper and lower lip; the scales above the trunk and tail end small, rounded, granulated

+ (On the neck, back, the base half of the tail and the outer sides of the extremities intermixed with double-sized bumps; along the sides from the front to the rear extremities there is a fold of skin;

small scales below the body; above dirty from greenish gray

+ (with a rose-reddish tinge now and then)

neck and back with 7 wide transverse black bands, through irregular spots of the same colour already mixed

(which are intermixed by similarly coloured irregular spots.

brownish gray underneath. —

Once again, Schlegel formally named this species without using Müller's manuscript name. In the first part of his "*Abbildungen*" (Schlegel 1837b:10) he noted the existence of a distinct variety of his *Gymnodactylus marmoratus* from New Guinea collected by Macklot (again presumably using Macklot's name as leader of the Commissie, although Müller was undoubtedly the person who studied the material), which was larger and somewhat differently coloured, although without giving any further details. An accompanying plate (Tab. 2, Fig. 1, reproduced here as Fig. 16) in the "Atlas" shows an individual which exactly matches Müller's description. While no name was provided directly in the text or on the plate, the introductory material for the final completed "*Abbildungen*" includes a "Systematische Uebersicht" (systematic overview) for the whole work, and on p. IX the name "*G. (Gymnodactylus) marmoratus* var. *Novae Guineae*" appears, citing both the text page and the plate. This use of a name with reference to the plate and description is sufficient under the Code of Zoological Nomenclature to validate the name nomenclaturally. Presumably, this taxonomic list of the entire work was published at the completion of the work, so that the name would date from 1844 rather than 1837 when the text of the first decade appeared. Brongersma (1934) redescribed the species, including notes on the two syntypes in the Naturalis collection, both registered as RMNH 2702. Both specimens are male. In a final nomenclatural twist, Brongersma's paper was preceded by a previous description (Brongersma 1928) of a different species as *Gymnodactylus novae-guineae*. That species was renamed as *Cyrtodactylus papuensis* by Brongersma (1934).

After these gecko species assigned to Boie, various other reptile species follow in Müller's notes, such as *Lycodon nuchalis* Müll., post quem corrected to "modertus", with the place "Amboina" and the obviously erroneous date "August 1828", since the commissary had already left Amboina on 21 April 1828 (Jacobs and Shea 2021:49) and did not reach it again on its return voyage until 5 September.

CONCLUSION

After little more than eight weeks on New Guinea, the Commissie set off again at the end of August 1828. Via Ambon, the members of the Commissie sailed to Koepang, today's Kupang, on Timor, where the scientists left the *Triton* and returned partly overland to Buitenzorg. Their arrival on 11 December 1829 was followed by explorations in West Java until June 1833. The Sumatra expedition followed from June 1833 to January 1834 and the Borneo expedition from July 1836 to January 1837, both under the sole leadership of Salomon Müller (Jacobs 2022). The return journey from Batavia, today's Jakarta, began on 12 April; Hellevoetsluis (off Rotterdam) was reached on 21 August 1837 (see Jacobs and Shea 2022:49). However, it should not be forgotten that Kuhl, Keultjes and van Hasselt, three of the four members of the first expedition's commission, and Boie, Zippelius,

van Raalten, Macklot, van Oort and later Horner, six of the second, died.

New Guinea was therefore by no means the focus of the entire undertaking. Nevertheless, it must be said that the research results were extraordinary. The sheer numbers of animals collected undoubtedly document that the main focus was on Borneo, Sumatra, Timor and, above all, Java itself: a list with the number of collected animals by Salomon Müller classified according to the main collecting areas Borneo, Sumatra, Buitenzorg/Java, New Guinea and Timor indicates that of a total of more than 31,000 specimens, only 409 were collected in New Guinea (NNM001001453_001). Other estimates, although a precise overview is lacking, assume more than 100,000 specimens (van Wingerden 2023:75). Despite the rather low numbers for New Guinea in comparison to the other islands, the scientific results for this short period were remarkable. Müller alone described, albeit unpublished, at least 16 species which he considered completely unknown. We cannot legitimately speculate whether Macklot's notes which were lost in a fire in 1832 would have added even more.

Müller's handwritten, never published opus, presented in the online-archive of Naturalis, published as facsimiles by Brill (Leiden), as NNM001001113 (Gassó et al. 2020), dealing with reptiles and amphibians exclusively, covers mainly the period from March 1827 to August 1828. We cannot offer more than a short excerpt in this article, omitting Amphibia like *Hylaplesia cornuta* Müll., *Bombinator oxycepalus* Müll., *Ceratophrys turpicula* Müll., *Rana poicilia* Müll., *Hyla sinuosa* Müll. and *Hyla impedita* Müll. and many reports on species Müller collected but recognized as already described by others. This all definitely deserves a thorough scientific treatment and publication.

As every selection always remains contestable, the one presented here can only offer a glimpse on the rich harvest reaped by the Natuurkundige Commissie. The basis for this limited analysis was mainly the already mentioned online-archive which deserves highest praise even if a thorough methodological introduction is missing, and—unavoidable in the light of the given complexity—mistakes occurred and possibly not all documents were discovered and included.

Even a superficial comparison between the shipment-lists and Müller's notes implies that not all of Müller's records were detected under the assumption that Müller indeed covered all species he and his colleagues had found. A thorough research study with the aim of a general presentation of the Commissie's achievement including the collection in Naturalis of today would be more than welcome. Nevertheless, this digital publication deserves the highest praise as it allows direct access worldwide. Together with Temminck's three-volume testimony of the Commissie's achievements, it constitutes the basis for an evaluation of the scientific results collected in twelve years in the East Indies.

Since most of these texts are only available in Dutch or online in manuscript form, which is hardly legible even for

the trained eye, reception of these findings has taken place with a rather limited scope at best. Nearly two hundred years after they were composed, we present selected texts here with a historical scientific contextualisation and commentary.

Together with the first part of this essay our primary intention was not to present a definitive analysis, but to open the door to a largely unexploited treasure, which undoubtedly makes further intensive study seem more than worthwhile.

ACKNOWLEDGMENTS

This article is largely based on material of Naturalis Leiden, including Salomon Müller's handwritten notes as well as Pieter van Oort's drawings and other documents. We sincerely thank Esther Dondorp and Karien Lahaise for their always kind support and constructive help and for providing high-resolution copies of the drawings and documents for printing.

We would like to express our gratitude to Wolfgang Böhme and Wolfgang Denzer for their many helpful suggestions and Paul Oliver for discussion on the identity of *Hemidactylus baliatus*. Last not least we thank Katharina Schmidt-Loske for providing her exceptional abilities to decipher even the most challenging handwritings.

NOTES

1. Temminck's record of the achievements of the Commissie was meant as a certificate of performance. It was published in 29 instalments from 1839 to 1847 (Husson and Holthuis 1955), although the volumes bear the nominal years 1839–1844, and ultimately comprised three volumes: “*Zoologie*” with the preface to the entire work; “*Land- en Volkenkunde*”; and “*Botanie*” edited by P. W. Korthals.

Originally 26 parts were planned for the three volumes of the work, although 29 parts were ultimately sent to subscribers, culminating with the title page of the respective volume. The completed volumes are not officially numbered, although the “*Zoologie*” volume begins with the editors' preface, dated 12 December 1839, and seems to have been the first of the three volumes to be completed. We follow Husson and Holthuis (1955) for the dating of the individual parts of Temminck's account, since the dates given on the title pages are not reliable. The page numbers given in the references to this volume are preceded by an indication of the corresponding part, since “*Zoologie*” consists of 6 individually paginated sections that do not correspond with the 12 sequential issued parts.

2. Jacobs and Shea (2022) listed an additional species, *Platydictylus monarchis*, in error. This gecko would become *Gekko monarchus* (Duméril & Bibron 1836) and was collected in Ambon.
3. While the text itself must be considered largely lost (although Hoogmoed (1980, 1982) reported the existence of some sections), some illustrations remain in Leiden and are currently being prepared for publication by the Society for the Study of Amphibians and Reptiles. At the beginning of the collection of 57 illustrations, some of which are missing, is a list “*Désignation des Planches pour le Graveur*”, which suggests that at least this part was ready for typesetting, and some actually exist with proper captions as print proofs. Nevertheless, as we know

from a letter of 23 June 1826 to Joannes Andreas Susanna (NNM001001201), the “administrateur” of the Rijksmuseum Leiden (together with its director Temminck, the most important partner in correspondence), Boie continued to suggest substitute illustrations while in the field. Evidently, he deemed recently drawn illustrations by van Oort more suitable and considered nuanced taxonomic distinctions appropriate in certain cases.

Since the drawings for Boie's *Erpétologie de Java* belong to the public domain of the Naturalis collection, we discuss some of their captions which are essential to interpreting Müller's manuscripts.

4. Schlegel's “*Essai*” was published as two independently paginated parts, apparently simultaneously. Hence, the part must be indicated in association with page number.
5. Schlegel (1826, 1827) was horrified at the uncredited use of some of Boie's names in works by Kaup and Fitzinger, and published two summaries of the classification from Boie's now-lost manuscript to place Boie's named genera and species on public record. Additionally, Heinrich's brother Friedrich published two classifications of snakes (F. Boie 1826, 1827), the second of which was intended as a critique and expansion, in light of subsequent papers, of the snake classification proposed by Merrem (1820). Friedrich's (1827) classification incorporated, with attribution, some of his brother's named species, sometimes with sufficient quotation of the Latin text from Heinrich's monograph to validate the names.

Article 12.2.5 of the *International Code of Zoological Nomenclature* allows for new generic names prior to 1931 to be considered available if they were published in combination with one or more previously available species names, without any need for a diagnosis or description. Hence, the listings of Schlegel (1826, 1827), F. Boie (1826) and Fitzinger (1826) can, in many cases, be considered to have validly published Boie's generic names, and it is therefore important to determine their relative dates of publication, with all four papers often having been considered to be published in 1826 (e.g., Wallach et al. 2014). The preface to Fitzinger's monograph is dated 4 June 1826, and Adler (1997) suggested a publication date around June or July, based on receipt of the book by the editor of *Isis von Oken* being reported in issue 9 of that journal for 1826, which Adler assumed to have been published in August because the issue contained a letter dated 29 July. However, *Isis* often published letters dated two or more months prior to the expected release of the issues (the following issue, for example, includes a letter dated 21 May). *Isis* was issued as monthly issues, with 12 issues per year. While no specific dates of release are noted on the issues, it must be assumed that the issues came out within a calendar year. Issue 1 for 1826 includes mention of receipt of a journal dated December 1825, and a book dated 1826, agreeing with the interpretation that the first issue for 1826 was the January issue. This would make issue 9 the September issue, so that the publication of Fitzinger (1826) can only be restricted to the period between June and August. The paper by F. Boie (1826) was published in issue 10 of *Isis*, giving it a date of publication of October 1826. Schlegel (1827) was published in issue 3 of the same journal in 1827. Although the first three issues of the journal for 1827 have a printer's mark with the year 1826 noted on them, issue 2 also includes notification of receipt of a book published in 1827, suggesting that the 1826 dates on these three issues was an error. Further, for these three issues to have appeared at the end of 1826 would have resulted in 15 issues being released in 1826, unlikely for a monthly journal.

This leaves just Schlegel (1826) to date. This paper was published in the *Bulletin des Sciences Naturelles et de Géologie*, which was also a monthly journal, with three volumes of four issues released in 1826. While these, like *Isis*, lacked explicit dates of publication on the issues, errata noted in subsequent issues give the second issue of Volume 9 (the third for the year 1826), containing Schlegel's paper, as being the October issue. Confirming that it antedated Schlegel (1827) is the commentary in Schlegel (1826:234) that his paper in *Isis* was to appear shortly ("Les principes et le ton qui règnent dans cet ouvrage m'engagent à donner à son sujet quelques observations critiques qui paraîtront sous peu dans l'*Isis*"); The principles and tone which reign in this work compel me to give some critical observations on its subject which will appear shortly in *Isis*).

Unfortunately, with both F. Boie (1826) and Schlegel (1826) appearing in October issues of unrelated journals, we are unable to identify the precise order of appearance of these two papers as yet.

6. The spelling and punctuation in our transcriptions correspond directly to the original. Thus, Müller's peculiarities are meticulously retained: "y" instead of "y", the frequent omission of the German umlaut, for example, in the abbreviation of his own name "Mull." as well as his preference of the colon in abbreviations instead of the period, like "P: v. Oort".

Usages of the time, such as indicating a double letter by an overline, are also retained, although Müller does not handle this consistently—see "Psamophis" v. "Psammophis".

7. At the time—until the decimal system introduced by Napoleon—French measurements were in use: foot (in French: pied), inch (pouce) and line (ligne), which were indicated with one, two and three apostrophes (i.e., 1 pied = 32.5 cm; 1 pouce = 2.71 cm; 1 ligne = 2.26 mm) (Jacobs and Koch 2021).
8. As was apparently the case with the skinks (Jacobs and Shea 2022), Müller seems to have adopted a nomenclature for the head shields of snakes defined and illustrated by Merrem (1820), and we adopt the modern names for these scales in translating them from the original text.
9. The abbreviation in the heading of this note could not be clarified. It looks like an elongated "y" but is certainly not meant as a letter. It is possibly a personal abbreviation of Müller, which is also used in his notes on *Hemidactylus baliatus* Müll.
10. Page changes in the original are indicated—such as here—by "_070".
11. Müller's *Dendrophis* species cannot be unequivocally linked to Gmelin's *Coluber pictus* (today: *Dendrelaphis pictus*), the only *Dendrelaphis* species name available at the time of the expedition, which does not occur on New Guinea. Gmelin's brief Latin description is not very detailed: "Coluber dorso caeruleo, lateribus linea atra in albidum delinente pictus. Rostrum *acutum*." (Gmelin 1789:1116; *Coluber* with a bluish back, a black line on the sides with a white outline delineates *pictus*. Snout pointed). Boie also refers to Gmelin but speaks of a "ex olivaceo fusca, splendore aeneo refulgens" (F. Boie 1827:530; from olive-brown, shining with a bronze lustre) instead of a bluish colour—possibly because of the ethanol.
12. These must have been additional to the specimens Heinrich Boie used to describe as *D. pictus* in his manuscript "*Erpétologie de Java*", which was completed before 1826. Boie apparently used specimens from Java that were already "In vielen Sammlungen" (F. Boie 1827:530; in many collections).

13. It is difficult to fully reconcile these shipping records with the current holdings of *Dendrelaphis* specimens in the Naturalis collection, with their online catalogue (<https://biportal.naturalis.nl/>) recording the following specimens collected by Müller:

- *Dendrelaphis inornatus* Boulenger 1897 (5 specimens, Müller, Samao)
- *Dendrelaphis inornatus* Boulenger 1897 (5 specimens, Müller and Macklot, Samao)
- *Dendrelaphis pictus* (Gmelin 1789) (4 specimens, Müller, Borneo)
- *Dendrelaphis formosus* (Boie 1827) (1 specimen, Müller, Padang).
- *Dendrelaphis caudolineatus* (Gray 1834a) (1 specimen, Müller and van Oort, Padang).

The Sumatran (Padang) and Bornean specimens must have been collected following the return of the Commissie from their New Guinea sojourn.

14. *Dendrophis* (meaning "tree snake") was another generic name originally created by Heinrich Boie in his "*Erpétologie de Java*". Heinrich's diagnosis was published by Friedrich Boie (1827), and his original concept of the genus included six species (Schlegel 1826, 1827). The concept used by Friedrich included eight species. However, Heinrich's creation of the genus was pre-empted by Fitzinger's (1826:29–30) use of Boie's generic name in a key and listing of only one of the species intended to be placed in the genus by Heinrich, *Coluber ahaetulla* Linnaeus 1758. While *Dendrophis* was used for many years for Asian bronzeback tree snakes, Fitzinger's use of Linnaeus' *ahaetulla*, which represents a South American species, as the type species resulted in *Dendrophis* becoming a junior synonym of *Leptophis*, and so the name *Dendrelaphis* Boulenger 1890 came into use for the Asian bronzeback tree snakes.
15. Boie's descriptions are highly structured, with high emphasis placed on eye size, the first character in each description: "Oculis mediocribus" for *D. dendrophila* and *D. multomaculata*, "Oculis magnis" for *D. cynodon* but for *D. drapiezii* "Oculis maximis" (Boie 1827: 549; medium-sized eyes; big eyes; largest eyes). His description of *drapiezii* also noted "scuto loreo nullo" (no loreal scale) and scale counts of "159 + 137". The ventral scale count is clearly wrong, possibly a mistake for 259 by Friedrich in copying across the information (Hoogmoed (1982) noted other transcription errors in Friedrich's work).
16. As noted by Schlegel (1837a part 2:270), Boie's description of *drapiezii*, which was presumably named after the Belgian naturalist Pierre Auguste Joseph Drapiez (1778–1856), was based on a specimen in the Natural History Museum in Brussels. Boie not only described the species in his unpublished "*Erpétologie de Java*" but provided an illustration on plate 38 as well.
17. These notes appear to be the preparatory materials for the accounts of the genus in his "*Essai*". Strangely, the scale counts differ somewhat between these two sources ("*Essai*" in parentheses): *D. irregularis*—236 + 93, 262 + 116 [barely readable] (250 + 100); *D. Drapiezii*—259 + 114, 264 + 154 (260 + 130); *D. Cynodon*—272 + 156, 248 + 142 (260 + 140). In his "*Abbildungen*" he claims for *D. Drapiezii*: "Bauchschilder finden sich gewöhnlich 260; aber die Schwanzschilder variiren an der Zahl von 114 bis 154" (Schlegel 1839a:49; Ventral shields are usually 260; but the caudal shields vary in number from 114 to 154). Obviously from the increased number of counts provided for some species, Schlegel had had the opportunity to study further speci-

- mens in between compiling his manuscript and the published “*Essai*”. Even more curiously, the scale count provided by Müller for his Lobo Bay specimen, 267 + 102 (NNM001001423_001) does not match the counts Schlegel provides for either *drapiezii* or *irregularis*.
18. In the “*Verhandeligen*” (Temminck 1839–1844 [–47]), *Tropidonotus* is only mentioned in passing, without any taxonomic description, and it is not covered at all in Schlegel’s “*Abbildungen*”.
 19. These annotations include, added to the description of a species to which no name is given by Kuhl (218), the name *Tropidonotus rhodomelas*, referencing plate 26 of the “*Erpétologie de Java*”. Curiously, Schlegel (1826, 1827) allocated that name to Kuhl and van Hasselt, although they did not name the taxon in these manuscript notes, while Friedrich Boie (1827) attributed it to Heinrich, providing the Latin description written by Heinrich to validate the name. Possibly Schlegel was recognising Kuhl and van Hasselt’s primacy in providing the description of the taxon despite not creating the name, later coined by Boie.
A second species, *Tropinotus subminiatus*, which Kuhl and van Hasselt had claimed for themselves by adding “Nobis” in these notes (212), also appears in Schlegel (1826, 1827) and F. Boie (1827), as well as in Schlegel’s “*Essai*”, all attributing the name to Reinw[ardt].
 20. Although the volume bears the publication year of 1817, it was published in 1816 (Roux 1976).
 21. That a term describing a snake diving from a tree like a javelin should be connected with a wriggling burrowing snake-like lizard is amusing but may simply reflect a desire by many early herpetologists to use any Greek or Latin word for snake to create a generic name for a snake-like reptile, without considering the original application of that name in the classical language.
 22. Oppel’s formal recognition of these as a distinct genus followed an earlier informal recognition of the vernacular “*Typhlopes*” by Schneider (1801:339)
 23. Schlegel’s “*Abbildungen*” were initially published in 1837–44 in so-called decades, i.e. 10 plates each with the corresponding text. The dating of the release of these decades of plates was explored by Jacobs and Koch (2021:71). However, they did not define which pages of text were released in association with the plates. As the text describing *Typhlops polygrammicus* was in a different part of the volume (p. 40) to the order of the plate of that species (plate 32), we need to further consider the release of the text. Examination of the printer’s marks at the foot of the first page of each signature provides evidence that the text signatures, while commencing as exact matches for the first few decades, did not exactly follow the plates to which they related in the later releases. Signatures 1 and 2, both of 16 pages (pp. 1–32), relate to Decade 1 completely, while signatures 3 and 4, again of 16 pages each, correspond to Decade 2 (pp. 33–64) completely. Decade 3, however, changes the pattern, with signatures 5 and 6 (16 pages each) along with signature 7 (8 pages), bringing the text to p. 104, not quite exactly providing corresponding text to plates 21–30, which cover species up to p. 108. Decade 4 should cover pages up to p. 126, but corresponds to signature 8 (16 pp.) and 9 (4 pp) with the last being p. 124, again a few pages short. Decade 5 corresponds to signature 10 (16 pp., 125–140), plus an unnumbered 11th signature of 16 pp, which equates to the 14 pages of introductory material (i–xiv), plus the last page of text and the reverse of that page.
For the case of *Typhlops polygrammicus*, this means that the text description appeared as part of Decade 2 (1839a) while the illustration on plate 32 appeared as part of Decade 4 (1840).
 24. This adjective also provided the common name of the taxonomic group caecilians, going back to Carl von Linné, the group to which Seba’s illustration and description belong. Linnaeus (1758) described the first species, *Caecilia tentaculata*.
 25. Curiously, the description of *Dibamus novaeguineae* uses what seems to be an unusual comparison in describing the width of the species: “sa grosseur est celle d’un tuyau de plume ordinaire” (Duméril and Bibron 1839:834; its size is that of an ordinary feather). A strangely similar comparison was used by Friedrich Boie for *Acontias coecus*: “von der Dicke einer Rabenfeder,” (Boie 1827:511; of the thickness of a raven’s feather). At least one even older reference also uses the thickness of a bird feather as reference to a reptile body: Schneider (1801:291), in redescribing the snake *Elaps lemniscatus* (Linnaeus), states “truncus pennae cygneae crassitie” (trunk of the thickness of a swan quill). Such comparisons are likely to have left the subsequent herpetological literature with the replacement of bird feathers as pens by more modern writing tools.
 26. While Gerrit van Raalten, the last survivor of the First Commissie, also participated in the Second Commissie as an artist, he had started with the First Commissie as taxidermist, and only took on duties as an artist following the death of the first artist Gerrit Laurens Keultjes. He had no formal training as an artist. Most of the reptile paintings from the Second Commissie are signed by van Oort, and the few that aren’t are of similar style to those that are signed. Among the herpetological artwork, only that of one of the frogs, *Hyla sinuosa*, is signed by van Raalten (Jacobs and Shea 2022:50). Hence, we presume, in the absence of clear evidence to the contrary that van Raalten painted reptiles, that the unscribed reptile paintings are the work of van Oort.
 27. The generic name *Calotes* was first created by Cuvier (1816:35), who also used the colloquial form Galéotes, and stated, quoting Pliny, that “le stellion (des latins) était nommé par les grecs galeotes, colotes et askalabotes” (the stellion (from the Latins) was named by the Greeks galeotes, colotes and askalabotes), with the choice of galeotes and calotes being arbitrary. Schlegel (1827:column 290), in summarising the classification from Boie’s “*Erpétologie de Java*”, used Galeotes, noting specifically that “Γαλέωτης bezeichnet bey den Griechen eine Eidechsenart und ist männlich. Καλότης indessen die Schönheit, und ist weiblich. Wir behalten das Erstere, in die französische Sprache ebenfalls übernommen, bey” (The Greeks called Galeotes a type of lizard and is male. Calotes, however, is the beauty, and is female. We keep the former, also adopted by the French language). Schlegel does not make it clear whether this interpretation is his alone, or whether it was followed by Boie. The use of *Calotes* by Müller suggests that Boie had used *Calotes*.
 28. Curiously, the very next drawing in the online-archive following *Calotes megapogon* is assigned by archive staff to *Gonocephalus chamaeleontinus* (NNM001000691), and is described by an unidentifiable author in pencil as “Gal[eotes]. Lophyre ad Java” and allotted to the draughtsman “v Oord”. The misspelling of the artist’s name and the imprecise species indication are surprising, and suggest the annotations were not by either Müller or Schlegel.
 29. In Kuhl’s description, the nuchal crest is “nuchali parvissima, humillissima diversa” (Kuhl 1820:108, the nuchal crest is very small, very low, and diverse). The description refers to both Seba (1734, Vol. I, pl. 89.1) and specimens in the Paris Museum.
 30. Maurevert was an artist who accompanied Alfred Duvaucel and Pierre-Médard Diard to India, and later followed Diard to Java about 1820. He later started working as an artist for the First

Commissie after the death of the original artist, Gerrit Keultjes, in September 1821 (Roberts 1993).

31. What Müller calls “Schenkelöffnungen” (thigh openings) is more correctly rendered by de Rooij in her redescription of *G. baliola* as “femoral pores in an angular series” of which she counts, probably on one side, “18” while Müller comes up with “34–38”, presumably summing both sides. Like Müller’s “deprimirt, scharfkantig” (depressed sharp-edged), she also refers to the shape of the tail as “depressed, with a sharp lateral edge” (de Rooij 1915:43).
32. The species name *fasciatus*, which also appears in Kuhl’s manuscript notes (above), appears not to have been formally published, but was replaced by *marmoratus*.
33. The lectotype (RMNH RENA.2710a.1) and paralectotypes (RMNH RENA.2710, 2710a, the two registration numbers covering a total of 14 specimens; Mecke et al. 2016) of *Cyrtodactylus marmoratus* Gray 1831 collected by Kuhl and van Hasselt, are kept in Naturalis (Leiden) under the name *Cyrtodactylus marmoratus* (Kuhl 1820). An additional two specimens sent to Paris by Schlegel were also considered part of the type series by Brygoo (1990), although Mecke et al. (2016) did not accept their type status, due to an inability to clearly link the specimens to Kuhl rather than members of the Second Commissie.
34. The similar-sounding name *Hemidactylus granosus* (Heyden 1827) is suggestive as a source, but this species only occurs in Egypt (Sinai Peninsula). For the moment it cannot be clarified what species Müller intended with his name *granosus*.

REFERENCES

- Adler, K. 1997. Editorial note. P. ii in: L. Fitzinger. *Neue Classification der Reptilien. Entwurf einer systematischen Anordnung der Schildkröten*. Facsimile Reprints in Herpetology. Society for the Study of Amphibians and Reptiles, Ithaca.
- Bechstein, J. M. 1802. *Herrn de la Cépède’s Naturgeschichte der Amphibien oder der eyerlegenden vierfüssigen Thiere und der Schlangen. Eine Fortsetzung von Buffon’s Naturgeschichte. Aus dem Französischen übersetzt und mit Anmerkungen und Zusätzen versehen*. Vol. 5. Industrie Comptoir, Weimar, ix, 200 p., 21 plates
- Boie, F. 1826. Generalübersicht der Familien und Gattungen der Ophidier. *Isis von Oken*. 19(10):columns 981–982.
- Boie, F. 1827. Bemerkungen über Merrem’s Versuch eines Systems der Amphibien. *Isis von Oken*. 20(6–7):columns 508–566.
- Boie, H. 1826. Merkmale einiger japanischen Lurche. *Isis von Oken*. 19:columns 203–216.
- Boie, H. 1827. H. Boie an Wagler. *Isis von Oken*. 20(8–9):columns 724–726.
- Boulenger, G. A. 1890. *The Fauna of British India, including Ceylon and Burma. Reptilia and Batrachia*. Taylor and Francis, London, xviii + 541 p.
- Boulenger, G. A. 1897. List of the reptiles and batrachians collected by Mr. Alfred Everett in Lombok, Flores, Suma and Saru, with descriptions of new species. *Annals and Magazine of Natural History*. (6)19:503–509.
- Bour, R. 2012. Description of Atlas and dates of publication of the plates. Pp. 21–31 in: A. M. C. Duméril and G. Bibron, *Erpétologie Générale: ou Histoire Naturelle complète des Reptiles*. Vol. 1. Facsimile reproduction. Society for the Study of Amphibians and Reptiles, Ithaca.
- Brongersma, L. D. 1928. Neue Reptilien aus dem Zoologischen Museum Amsterdam. *Zoologischer Anzeiger*. 75:251–257.
- Brongersma, L. D. 1934. Contributions to Indo-Australian herpetology. *Zoologische Mededelingen*. 17:161–251.
- Brygoo, É.-R. 1985. Les types de scincidés (Reptiles, Sauriens) du Muséum national d’Histoire naturelle. Catalogue critique. *Bulletin du Muséum National d’Histoire Naturelle*. (4)7(Section A)(3)supplément:1–126.
- Brygoo, É. R. 1990. Les types de gekkonidés (Reptiles, Sauriens) du Muséum national d’Histoire naturelle. Catalogue critique. *Bulletin du Muséum National d’Histoire Naturelle*. (4)12(Section A)(3–4)supplément:19–141.
- Cuvier G. 1816 (“1817”). *Le Règne Animal distribué d’après son organisation, pour servir de base a l’histoire naturelle des animaux et d’introduction a l’anatomie comparée. Tome II, contenant les reptiles, les poissons, les mollusques et les annélids*. Déterville, Paris, xviii, 532 p.
- Cuvier, G. 1829. *Le Règne Animal distribué d’après son organisation, pour servir de base a l’histoire naturelle des animaux et d’introduction a l’anatomie comparée. Tome II*. Second Edition. Déterville et Crochard, Paris, xv, 406 p.
- Daudin, F. M. 1802. *Histoire naturelle, générale et particulière des Reptiles. Tome Troisième*. F. Dufart, Paris, 452 p., pls. XXIX–XLV.
- De Lang, R. and G. Vogel 2005. *The snakes of Sulawesi. A field guide to the land snakes of Sulawesi with identification keys*. Edition Chimaira, Frankfurt am Main, 312 p.
- De Silva, A. 2001. *The herpetofauna of Sri Lanka. An historical overview, current status with checklists*. Amphibia and Reptile Research Organisation of Sri Lanka, [Colombo], 91 p.
- Denzer, W., J. Hallermann, U. Manthey and A. Ohler 2020. *Lophyrus spinosus* C. Duméril & A. Duméril, 1851, a case of mistaken identity. *Evolutionary Systematics*. 4(1):45–52.
- Denzer, W. and E. Dondorp 2023. *Calotes megapogon* (Squamata, Agamidae, Draconinae): nomenclatural and taxonomic ramifications of the naming of an undescribed species. *Bionomina*. 32:29–40.
- Denzer, W. and U. Manthey 2016. Remarks on the taxonomy and nomenclature of the genus *Hypsilurus* Peters, 1867 (Reptilia, Agamidae, Amphibolurinae). *Zoosystematics and Evolution*. 92(1):102–110.
- Denzer, W. and F. Tillack 2024. The original description of *Agama gutturosa* Merrem, 1819 and its nomenclatural implication on the genus *Bronchocela* Kaup, 1827 (Squamata: Agamidae). *Zootaxa*. 5507(2):337–355.
- de Rooij, N. 1915. *The reptiles of the Indo-Australian archipelago, I. Lacertilia, Chelonia, Emydosauria*. E. J. Brill, Leiden, xiv, 384 p.
- Duméril, A. M. C. 1805. *Zoologie Analytique, ou méthode naturelle de classification des animaux, rendue plus facile a l’aide de tableaux synoptiques*. Allais, Paris, xxxii, 344 p.
- Duméril, A. M. C. and G. Bibron 1836. *Erpétologie Générale ou Histoire Naturelle Complète des Reptiles. Tome Troisième*. Roret/Fain, Paris, iv, 518 p.
- Duméril, A. M. C. and G. Bibron 1837. *Erpétologie Générale ou Histoire Naturelle Complète des Reptiles. Tome Quatrième*. Roret/Fain, Paris, ii, 572 p.
- Duméril, A. M. C. and G. Bibron 1839. *Erpétologie Générale ou Histoire Naturelle Complète des Reptiles. Tome Cinquième*. Roret/Fain et Thunot, Paris, viii, 855 p.
- Duméril, A. M. C., G. Bibron and A. Duméril 1854. *Erpétologie Générale ou Histoire Naturelle Complète des Reptiles. Tome Septième*. Roret/Duval et Herment, Paris, vii, iv, xvi, xii, 1536 p.

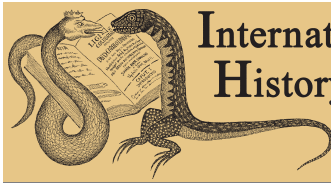
- Duméril, C. and A. Duméril 1851. *Catalogue methodique de la collection des reptiles du Museum d'histoire naturelle de Paris*. Gide et Baudry/Roret: Paris. iv + 224 p.
- Duméril, A. 1856. Description des Reptiles nouveaux ou imparfaitement connus de la collection du Muséum d'Histoire naturelle et remarques sur la classification et les caractères des reptiles. Deuxième Mémoire. Troisième, Quatrième et Cinquième Familles de l'Ordre des Sauriens (Geckotiens, Varaniens et Iguaniens). *Archives du Museum d'Histoire Naturelle*. 8:437–587, pl. xvii–xxiv.
- Duyker, E. 2014. *Dumont d'Urville, explorer & polymath*. Otago University Press, Otago, 671 p.
- Figuroa, A. 2021. The type species of *Bronchocela* Kaup, 1827 and lectotype designations for *Agama cristatella* Kuhl, 1820 and *Agama gutturosa* Merrem, 1820 (Squamata: Iguania Agamidae). *Zootaxa*. 7–400.
- Fitzinger, L. 1826. *Neue classification der reptilien nach ihren natürlichen verwandtschaften: nebst einer verwandtschafts-tafel und einem verzeichnisse der reptilien-sammlung des K. K. zoologischen museum's zu Wien*. J. G. Heubner, Wien, [iv], 66 p., 1 pl.
- Freycinet, L. de 1829. *Voyage autour du monde, entrepris par Ordre du Roi, sous le ministère et conformément aux instructions de S. Exc. M. le Vicomte du Bouchage, Secrétaire d'Etat au Département de la Marine, Exécuté sur les corvettes de S. M. l'Uranie et la Physicienne, pendant les années 1817, 1818, 1819 et 1820. Historique. Tome Deuxième. Première Partie*. Pillet-Ainé, Paris, 515 p.
- Gassó, E., L. Stork, A. Weber, M. Ameryan and K. Wolstencroft. (Editors) 2020. *Natuurkundige Commissie Archives Online*. Brill, Leiden.
- Gmelin, J.F. 1789. *Caroli a Linné Systema naturae. Tomus Primus, Editio Decima Tertia, Aucta, Reformata*. G. E. Beer, Lipsiae, 1033–1516 p.
- Gray, J. E. 1825. A synopsis of the genera of reptiles and amphibia, with a description of some new species. *Annals of Philosophy*. 2(10):193–217.
- Gray, J. E. 1827. A synopsis of the genera of saurian reptiles, in which some new genera are indicated, and the others reviewed by actual examination. *Philosophical Magazine, or Annals of Chemistry, Mathematics, Astronomy, Natural History and General Science*. (2)2(7):54–58.
- Gray J. E. 1831. A synopsis of the species of Class Reptilia. Pp. 1–110 in: E. Griffith and E. Pidgeon (Editors), *The animal kingdom arranged in conformity with its organisation by the Baron Cuvier with additional descriptions of all the species hitherto named, and of many before noticed*. Whittaker, Treacher and Co., London.
- Gray, J. E. 1834a. Lined Tailed Tree Snake. – *Ahaetula caudolineata*. Nob. Pl. 81 in: Gray, J. E. *Illustrations of Indian Zoology; chiefly selected from the collection of Major-General Hardwicke, F.R.S., L.S., M.R.A.S., M.R.I.A., &c., &c.* Vol. II. Adolphus Richter & Co./Padbury, Allen & Co., London.
- Gray, J. E. 1834b. Specimens were exhibited of several reptiles, which were accompanied by notes by Mr Gray. A new genus of Geckotidae. *Proceedings of the Zoological Society of London*. 2:99–101.
- Gray, J. E. 1842. Descriptions of some new species of Reptiles, chiefly from the British Museum collection. Pp. 57–59 in: J. E. Gray (Editor). *The Zoological Miscellany*. Treuttel, Wurtz and Co., London.
- Gray, J. E. 1845. *Catalogue of the Specimens of Lizards in the Collection of the British Museum*. Edward Newman, London, xxviii, 289 p.
- Greer, A. E. 1985. The relationships of the lizard genera *Anelytropsis* and *Dibamus*. *Journal of Herpetology*. 19(1):116–156.
- Günther, A. 1867. Additions to the knowledge of Australian reptiles and fishes. *Annals and Magazine of Natural History*. (3)20:45–57.
- Günther, A. 1872. Seventh account of new species of snakes in the collection of the British Museum. *Annals and Magazine of Natural History*. (4)9:13–37.
- Hedges, S.B., A. B. Marion, K. M. Lipp, J. Marin. and N. Vidal, N. 2014. A taxonomic framework for typhlopoid snakes from the Caribbean and other regions (Reptilia, Squamata). *Caribbean Herpetology*. 49:1–61.
- Heyden, C. H. G. von 1827. Reptilien. Pp. 1–24 in: E. Rüppell, *Atlas zu Reise im nördlichen Afrika. I. Zoologie*. H. L. Brönnert, Frankfurt a. M.
- Hoogmoed, M. S. 1980. Revision of the genus *Atractus* in Surinam, with the resurrection of two species (Colubridae, Reptilia). Notes on the herpetofauna of Surinam VII. *Zoologische Verhandelingen*. 175: 3–47 + pl. 1–6.
- Hoogmoed, M. S. 1982. Nomenclatural problems relating to *Atractus trilineatus* Wagler, 1828. *Zoologische Mededelingen*. 56(10): 131–138.
- Husson, A. M. and L. B. Holthuis 1955. The dates of publication of “Verhandelingen over de Natuurlijke Geschiedenis der Nederlandsche Overzeesche Bezittingen” edited by C. J. Temminck. *Zoologische Mededelingen*. 34(2):17–24.
- Jacobs, H. J. and A. Koch 2021. On the discovery and scientific description of the Emerald Tree Monitor (*Varanus prasinus* [Schlegel, 1839]). *Bibliotheca Herpetologica*. 15(7):61–76.
- Jacobs, H. J. and G. M. Shea 2022. Eight weeks in Lobo Bay. The Natuurkundige Commissie on New Guinea in 1828. I. *Scincus* and *Centroplites* (Scincidae). *Bibliotheca Herpetologica*. 16(6):48–81.
- Jacobs, H. J. 2022. Salomon Müller — ein unterschätzter deutscher Naturforscher. *Sekretär*. 22:21–56.
- Jan, G. 1863. *Elenco sistematico degli ofidi descritti e disegnati per l'iconografia generale*. A. Lombardi, Milano, vii, 143 pp.
- Kaiser, H., V. L. Carvalho, J. Ceballos, P. Freed, S. Heacox, B. Lester, S. J. Richards, C. R. Trainor, C. Sanchez and M. O'Shea 2011. The herpetofauna of Timor-Leste: a first report. *Zookeys*. 109:19–86.
- Kaiser, H., S. Mecke, C. M. Kaiser and M. O'Shea 2021. Three's Company: discovery of a third syntype of *Stegonotus lividus*, a species of colubrid snake from Pulau Semau, Lesser Sunda Islands, Indonesia, with comments on an unpublished 19th Century manuscript by the naturalist Salomon Müller. *Zootaxa*. 5039(1):56–70.
- King, M., R. A. Sadlier and P. Horner 1989. A note on the status of *Gehyra baliola* (Duméril and Duméril, 1851) in Australia. *The Beagle, Records of the Northern Territory Museum of Arts and Sciences*. 6(1):163–167.
- Kuhl, H. 1820. *Beiträge zur Zoologie und vergleichenden Anatomie. Erste Abtheilung: Beiträge zur Zoologie*. Verlag der Hermannschen Buchhandlung, Frankfurt am Main, 152 p.
- Kuhl, H. and J. C. van Hasselt 1822a. Aus einem Schreiben von Dr. Kuhl und Dr. Van Hasselt aus Java, an Professor Th. van Swinderen zu Gronigen. *Isis von Oken*. 10:columns 472–476.

- Kuhl, H. and J. C. van Hasselt 1822b. Uittreksels uit brieven van Heeren Kuhl en van Hasselt, aan de Heeren C. J. Temminck, Th. van Swinderen en W. de Haan, geschreven in de Straat Sunda, den 17 December, 1820; Buitenzorg 2 Maart 1821; Buitenzorg, den 10 den Junij 1821; Pijhorjavor aan den voet van den Pangerango, 18 Julij 1821; Buitenzorg den 8 Augustus 1821; Buitenzorg den 12 Augustus 1821; Tjichanjar, aan den voet van den Pangerango 20 Julij 1821. *Algemeene konst- en letter-bode*. 1(7):99–104.
- Laurenti, J. N. 1768. *Specimen medicum, exhibens synopsis reptilium emendatum cum experimentis circa venena et antidota reptilium austriacorum*. Joan. Thom. Nob. De Trattner, Viennae, 214 p., V pls.
- Linnaeus, C. 1758. *Systema Naturae per regna tria naturae, secundum Classes, Ordines, Genera, Species, cum characteribus, differentiis, synonymis, locis. Editio Decima, Reformata. Tomus I. Laurentii Salvii, Holmiae*, 823 + [1] p.
- Lidth de Jeude, T. W. van 1911. Reptilien (Schlangen). *Nova Guinea*. 9: 265–287.
- Malnate, E. V. 1960. Systematic division and evolution of the colubrid snake genus *Natrix*, with comments on the subfamily Natricinae. *Proceedings of the Academy of Natural Sciences of Philadelphia*. 114(8):151–199.
- Malnate, E. V. and G. Underwood 1988. Australasian natricine snakes of the genus *Tropidonophis*. *Proceedings of the Academy of Natural Sciences of Philadelphia*. 140(1):59–201.
- Manthey, U. and W. Denzer 2006. A revision of the Melanesian-Australian Angle Head Lizards of the genus *Hypsilurus* (Sauria: Agamidae: Amphibolurinae), with description of four new species and one new subspecies. *Hamadryad*. 30(1–2):1–40.
- Manthey, U. and W. Denzer 2016. Melanesische Winkelkopfagamen der Gattung *Hypsilurus* Peters, 1867 — Teil 1: Arten von Neuguinea. *Sauria, Berlin*. 38(3):11–36.
- McDowell, S. B. 1967. *Aspidomorphus*, a genus of New Guinea snakes of the family Elapidae, with notes on related genera. *Journal of Zoology*. 151(4):497–543.
- McDowell, S. B. 1974. A catalogue of the snakes of New Guinea and the Solomons, with special reference to those in the Bernice P. Bishop Museum, Part I. Scolecophidia. *Journal of Herpetology*. 8(1):1–57.
- Mecke, S., M. Kieckbusch, L. Hartmann and H. Kaiser 2016. Historical considerations and comments on the type series of *Cyrtodactylus marmoratus* Gray, 1831, with an updated comparative table for the bent-toed becos of the Sunda Islands and Sulawesi. *Zootaxa*. 4175(4):353–365.
- Mees, G. F. 1987. On the generic names *Gonydactylus* Kuhl & van Hasselt, 1822, *Goniodactylus* Schlegel, 1826, and *Gonyodactylus* Wagler, 1830 (Reptilia: Sauria: Gekkonidae). *Zoologische Mededelingen*. 61(10):137–140.
- Merrem, B. 1819. *Agama*. Pp. 162–168 in: J. S. Ersch and J. G. Gruber (Editors) *Allgemeine Encyclopädie der Wissenschaften und Künste in alphabetischer Folge von genannten Schriftstellern bearbeitet. Theil 2 Äga-Aldus*. J. F. Gleditsch, Leipzig.
- Merrem, B. 1820. *Versuch eines Systems der Amphibien/Tentamen Systematis Amphibiorum*. J. C. Kreiger, Marburg, xv, 191 p., 1 pl. [duplicating facing pages of German and Latin with identical pagination, up to p. 188]
- Metzger, G. A., F. Kraus, A. Allison and C. L. Parkinson 2010. Uncovering cryptic diversity in *Aspidomorphus* (Serpentes: Elapidae): evidence from mitochondrial and nuclear markers. *Molecular Phylogenetics and Evolution*. 54(2):405–416.
- Meyer, A. B. 1874. Eine Mittheilung von Herrn. Dr. Adolf Berhard Meyer über die von ihm auf Neu-Guinea und den Inseln Jobi, Mysore und Mafoor im Jahre 1873 gesammelten Amphibien. *Monatsberichte der Königlichen Preussischen Akademie der Wissenschaften zu Berlin*. 1874:128–140.
- Mörzer Bruyns, W. F. J. 2018. *Met de Triton en de Iris naar Nieuw-Guinea*. Walburg Pers, Zutphen, 384 p.
- Müller, S. 1840–1841. Bijdragen tot de kennis van Nieuw-Guinea. Pp. 1–80, in: C. J. Temminck (Editor). *Verhandelingen over de natuurlijke Geschiedenis der Nederlandsche Overzeesche Bezittingen. Land- en Volkenkunde*. [released in issues 1–3 fide Husson and Holthuis 1955] S. Luchtmans and J. Luchtmans, Leiden.
- Oppel, M. 1811. *Die Ordnungen, Familien und Gattungen der Reptilien als Prodrome einer Naturgeschichte derselben*. Joseph Lindauer, München, xii, 86 p.
- Pyron, R. A. and V. Wallach 2014. Systematics of the blindsnakes (Serpentes: Scolecophidia: Typhlopidae) based on molecular and morphological evidence. *Zootaxa*. 3829:1–81.
- Roberts, T. R. 1993. The freshwater fishes of Java, as observed by Kuhl and van Hasselt in 1820–23. *Zoologische Verhandlungen*. 285:1–94.
- Rooijen, J. van and G. Vogel 2016. On the status of three nominal species in the synonymy of *Dendrelaphis calligaster* (Günther, 1867) (Serpentes: Colubridae). *Zootaxa*. 4093(2):293–300.
- Rooijen, J. van, G. Vogel and R. Somaweera 2015. A revised taxonomy of the Australo-Papuan species of the colubrid genus *Dendrelaphis* (Serpentes: Colubridae). *Salamandra*. 51(1):33–56.
- Roux, C. 1976. On the dating of the first edition of Cuvier's *Règne Animal*. *Journal of the Society for the Bibliography of Natural History*. 8(1):31.
- Schlegel, H. 1826. Notice sur l'Erpétologie de l'île de Java. *Bulletin des Sciences Naturelles et de Géologie*. 9(2):233–240.
- Schlegel, H. 1827. Erpetologische Nachrichten. *Isis von Oken*. 20(3):columns 281–294.
- Schlegel, H. 1837a. *Essai sur la physionomie des serpens. 2 Teile. Partie Générale + Partie Descriptive*. J. Kips, J. Hz. and W. P. van Stockum, La Haye, xxviii, 251, 606, xvi p.
- Schlegel, H. 1837–44. *Abbildungen neuer oder unvollständig bekannter Amphibien, nach der Natur oder dem Leben entworfen und mit einem erläuternden Texte begleitet*. Arnz & Co., Düsseldorf, xiv, 141 p.
- Decade 1 (pl. I–X + p. 1–32) 1837b
 - Decade 2 (pl. XI–XX + p. 33–64) 1839a
 - Decade 3 (p. XXI–XXX + p. 65–104) 1839b
 - Decade 4 (p. XXXI–XL + p. 105–124) 1840
 - Decade 5 (pl. XLI–L + pp. i–xiv + 125–142) 1844
- Schlegel, H. and S. Müller 1845. Over de slangen van het geslacht *Elaps*, welke den Indischen Archipel bewonen. [Reptilia] Pp. 63–68 in: C. J. Temminck (Editor). *Verhandelingen over de natuurlijke Geschiedenis der Nederlandsche Overzeesche Bezittingen. Zoologie*. [released in issue 12, Reptilia pp. 29–72 fide Husson and Holthuis 1955]. S. Luchtmans and J. Luchtmans, Leiden.
- Schneider, J. G. 1801. *Historiae Amphibiorum naturalis et literariae. Fasciculus Secundus continens Crocodilos, Scincos, Chamaesauras, Boas, Pseudoboas, Elapes, Angues, Amphibaenas et Caecillas*. Fried. Frommann, Jenae, vi, 364 p., 2 pls.

- Seba, A. 1734–65. *Locupletissimi rerum naturalium thesauri accurata descriptio, et iconibus artificiosissimis expressis, per universam physicis historiam*. Tomus II. Janssonio-Waesbergios, J. Wetstenium & Gul. Smith, Amsterdam. Vol. I: 1734, 178 p.; Vol. II: 1735, 154 p.
- Skipwith, P. L. and P. M. Oliver 2014. A new *Gehyra* (Gekkonidae: Reptilia) from New Guinea with unique caudal scalation. *Zootaxa*. 3827(1):57–66.
- Smith, M. A. 1935. *The Fauna of British India, including Ceylon and Burma. Reptilia and Amphibia. Vol. II.—Sauria*. Taylor and Francis, London, xiii, 440 p.
- Stejneger, L. 1907. The herpetology of Japan and adjacent territory. *United States National Museum Bulletin*. 58:i–xx, 1–77, pl. I–XXXV.
- Susanna, J.A. 1834. *Levensschets van Hendrik Boie: en hulde aan zijne deugden en verdiensten*. P. Meijer Warnars, Amsterdam, vi, 288 p.
- Temminck, C. J. (Editor) 1839–44 [1839–1847]. *Verhandelingen over de natuurlijke Geschiedenis der Nederlandsche Overzeesche Bezittingen*. S. Luchtmans and C.C. van der Hoek, Leiden.
 - Zoologie [1839–1845 fide Husson and Holthuis 1955]
 - Land- en Volkenkunde [1840–1847 fide Husson and Holthuis 1955]
 - Botanica [1840–1844 fide Husson and Holthuis 1955]
- Wallach, V., K. L. Williams and J. Boundy 2014. *Snakes of the World. A Catalogue of Living and Extinct Species*. CRC Press, Boca Raton, xxvii 1227 p.
- Weijola, V. 2015. Case 3676. *Tupinambis indicus* Daudin, 1802 (currently *Varanus indicus*; Reptilia, Squamata): proposed conservation of usage of the specific name by replacement of the neotype. *Bulletin of Zoological Nomenclature*. 72(2):134–141.
- Wingerden, P. van 2023. *Layered Loyalties: The Natuurkundige Commissie in the Netherlands Indies (1820-1850)*. Dissertation, Universit t Leiden.

We suggest the following format for citing this article:

Jacobs, H. J., and G. M. Shea. 2025. The Natuurkundige Commissie on New Guinea in 1828. II. Serpentes (Colubridae, Elapidae, Typhlopidae) and Sauria (Agamidae, Dibamidae, Gekkonidae, Varanidae). *Bibliotheca Herpetologica* 19(6):57–100.



***Testudo atlas* Barton, 1806, a long-forgotten synonym of the Gopher Tortoise (*Gopherus polyphemus*) and a senior secondary homonym of the largest tortoise that ever lived**

Aaron M. Bauer

Department of Biology and Center for Biodiversity and Ecosystem Stewardship,
Villanova University, 800 Lancaster Avenue, Villanova, Pennsylvania 19085, USA
aaron.bauer@villanova.edu

Johann Abraham Albers (1772–1821; Fig. 1) was a German physician and anatomist who was trained in Jena (M.D. 1795), Göttingen, Marburg, Vienna, London and Edinburgh, but returned to his natal Bremen in 1798, where he remained for the remainder of his life (Bynum 1968). In addition to his own research, Albers was active in translating and facilitating the translation of foreign medical works into German. In the short-lived periodical he edited, *Amerikanische Annalen der Arzneykunde, Naturgeschichte, Chemie und Physik* (1802–1803) Albers specifically reviewed for the German audience the medical and scientific works that were being produced in America. At a time when American science was generally held in low regard by the scientific and medical establishments in Europe, and nearly all American physicians were still being trained in Europe, Albers saw and appreciated the promise of American science (Bynum 1968). Among the numerous articles and books reviewed by Albers were two by the noted American naturalist and physician Benjamin Smith Barton (1766–1815; Fig. 2): *Fragments of the Natural History of Pennsylvania* (1799, reviewed in the *Annalen*, vol. 1:7–15) and *Collections for an Essay Towards a Materia Medica of the United States* (1801, reviewed in vol. 2:10–30).

Benjamin Smith Barton was based in Philadelphia, the cultural and intellectual hub of the United States at the turn of the 19th century. Although he was plagued by unfinished projects, chronic debt, and was considered by some ambitious, untalented and unqualified (e.g., he never received the medical degree he claimed to have; Graustein 1961, Tanner-Read 2012), Barton nonetheless achieved success and renown, holding positions of prestige and respect in institutions and societies in the United States and enjoying a positive reputation in Europe (Pennel 1942; Ewan and Ewan 2007), where he had established a network of correspondents (Barton 1836; Messer 2022), J.A. Albers being one of these.

Barton was prolific, writing on medical topics and ethnography as well as natural history. In the field of herpetology his main contributions were on salamanders, rattlesnakes, and the alligator (see Pennell 1942 and Adler 2007 for summaries of these major works). Many of his



Fig. 1. Johann Abraham Albers. Österreichische Nationalbibliothek – Austrian National Library (Public Domain Mark 1.0).

papers were addressed to European colleagues and published in the form of letters to particular scientists. For example, his monograph on *Siren* (Barton 1808) was addressed to the philologist Johann Gottlob Schneider (1750–1822), although it was apparently never sent to him (Ewan and Ewan 2007). However, beyond his more noteworthy contributions on amphibians and reptiles, Barton also published smaller notes, largely unnoticed by later workers, some of which proposed new names. For example, Barton (1807) erected three new

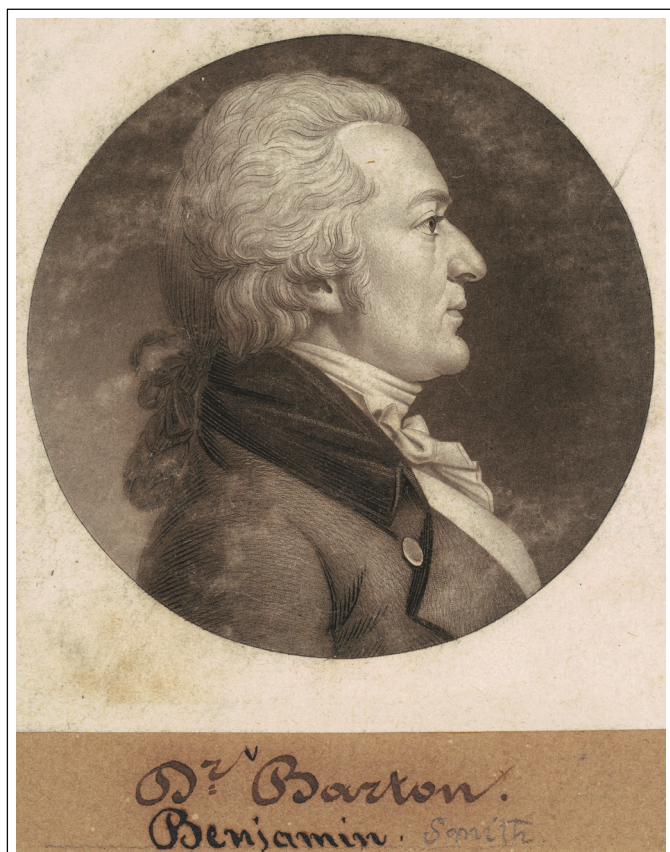


Fig. 2. Portrait (mezzotint and engraving) of Benjamin Smith Barton (1802) by Charles B.J. Fèvre de Saint-Mémin (1770–1852). Accession number 2015.19.1584.24.8, National Gallery of Art, Washington, D.C. (Open Access under Creative Commons Zero). William Paul Crillon Barton (1836), nephew of B.S. Barton, identified this portrait as the most accurate likeness of his uncle, who was 36 at the time of the sitting.

names for species of *Cryptobranchus* in *The Philadelphia Medical and Physical Journal*, a periodical that he founded and edited. This paper had apparently been cited only once until it was rediscovered recently by Frétey and Raffaëlli (2021). I here provide a brief discussion of another Barton herpetological contribution, the description of a tortoise, that seems to have escaped detection for more than 200 years.

In a letter to “Doctor Albers” in Bremen, published in the *Magazin für den neuesten Zustand der Naturkunde* 12 (5) of November 1806 (Fig. 3) and presumably translated into German by its editor, Johann Heinrich Voigt (1751–1823) or perhaps by Albers himself, Barton mentioned, among other things, a new chelonian that he intended to describe.

“Noch besitze ich eine sehr merkwürdige Species von Schildkröten, die sich sehr wohl befindet und ein Bewohner von Georgia und Florida ist. Ich finde sie noch von keinem systematischen Naturforscher beschrieben, doch finden Sie einige Nachrichten davon in der Reisebeschreibung meines Freundes Bartram. In der Beschreibung, die ich davon mittheilen will,

werde ich sie vielleicht *Testudo atlas* nennen, und zwar wegen ihrer außerordentlichen Stärke, besonders im Tragen großer Gewichte auf ihrem Rücken. Ein solches zwölf bis funfzehn Pfund schweres Thier kann einen mittelmäßig starken Mann eine ziemliche Strecke auf seinem Rücken forttragen.”

Further, I possess a very remarkable species of tortoise, which is in very good health, and is an inhabitant of Georgia and Florida. I have not yet found it described by any systematic naturalist, but you will find some information about it in my friend Bartram’s account of his travels. In the description I shall give of it I shall perhaps call it *Testudo atlas*, from its extraordinary strength, especially in carrying great weights on its back. Such an animal, weighing from twelve to fifteen pounds, can carry a moderately strong man a considerable distance on its back [translation by AMB].

As the only tortoise occurring in Georgia and Florida, the taxon in question is clearly referable to the species currently recognized as *Gopherus polyphemus* (Daudin, 1801) (Fig. 4). Barton, whose letter to Albers was dated 7 January 1806, was apparently unaware of Daudin’s description, which was also based on information derived from William Bartram’s (1739–1823) *Travels* through southeastern British North America (including the “Indian Reserve”). Likewise, he either did not notice, or forgot, that Bartram (1791:18) in his *Travels* had applied the binomen *Testudo polyphaemus*¹ to the tortoise in a footnote, or perhaps he did not consider that Bartram had intended to coin a new name by this usage. Alternatively, he may simply wanted to avoid giving credit in order to promote himself, a well-known characteristic of Barton’s personality (Harper 1952; Graustein 1961).

The text accompanying Bartram’s (1791) initial proposal of the name *Testudo polyphaemus* is brief: “The dens, or caverns, dug in the sand-hills by the great land-tortoise, called here Gopher* [in footnote: * *Testudo polyphaemus*], present a very singular appearance: these vast caves are their castles and diurnal retreats, from which they issue forth in the night, in search of prey. The little mounds, or hillocks of fresh earth, thrown up in great numbers in the night, have also a curious appearance.” However, later in the *Travels* he provides a much more extensive discussion of the same animal, including an detailed (for the time) description of the tortoise and its natural history:

“[p. 182] Observed as we passed over the sand hills, the dens of the great land tortoise, called gopher : this

¹ Although nearly identical in content and layout to the 1791 Philadelphia first edition, the London and Dublin editions of 1792 used the spelling *Testudo polyphemus*, as did subsequent editions and translations. The work of Bartram was likely known to Albers through its German translation (Bartram 1793).

strange creature remains yet undescribed by historians and travellers. The first signs of this animal's existence, as we travel Southerly, are immediately after we cross the Savanna River. They are to be seen only on the high dry sand hills. When arrived at its greatest magnitude, the upper shell is near eighteen inches in length, and ten or twelve inches in breadth ; the back is very high, and the shell of a very hard bony substance, consisting of many regular compartments, united by sutures, in the manner of the other species of tortoise, and covered with thin horny plates. The nether or belly shell is large, and regularly divided transversely into five parts : these compartments are not knit together like the sutures of the skull, or the back shell of the tortoise, but adhere, or are connected together by a very ridgy horny cartilage, which serves as hinges for him to shut up his body within his shell at pleasure. The fore part of the belly shell towards its extremity is formed somewhat like a spade, extends forward near three inches, and is about an inch and a half in breadth ; its extremity is a little bifid; the posterior division of the belly shell, is likewise protended backwards considerably, and is deeply bifurcated.

The legs and feet are covered with flat horny squamæ ; he seems to have no clefts in them or toes, but long flattish nails or talons, somewhat in [p. 183] resemblance to the nails of the human fingers, five on the fore feet ; the hind legs or feet appear as if truncated, or as stumps of feet, armed all round with sharp, flattish strong nails, the number undetermined or irregular ; the head is of a moderate size, the upper mandible a little hooked, the edges hard and sharp ; the eyes are large ; the nose picked ; the nostrils near together and very minute ; the general colour of the animal is a light ash or clay, and at a distance, unless it is in motion, any one would disregard or overlook it as a stone or an old stump. It is astonishing what a weight one of these creatures will bear ; it will easily carry any man standing on its back, on level ground. They form great and deep dens in the sand hills, casting out incredible quantities of earth. They are esteemed excellent food; the eggs are larger than a musket ball, perfectly round, and the shell hard."

Bartram's (1791) description of *Testudo polyphæmus* is certainly adequate to unambiguously identify the species, however, Opinion 447 of the International Commission on

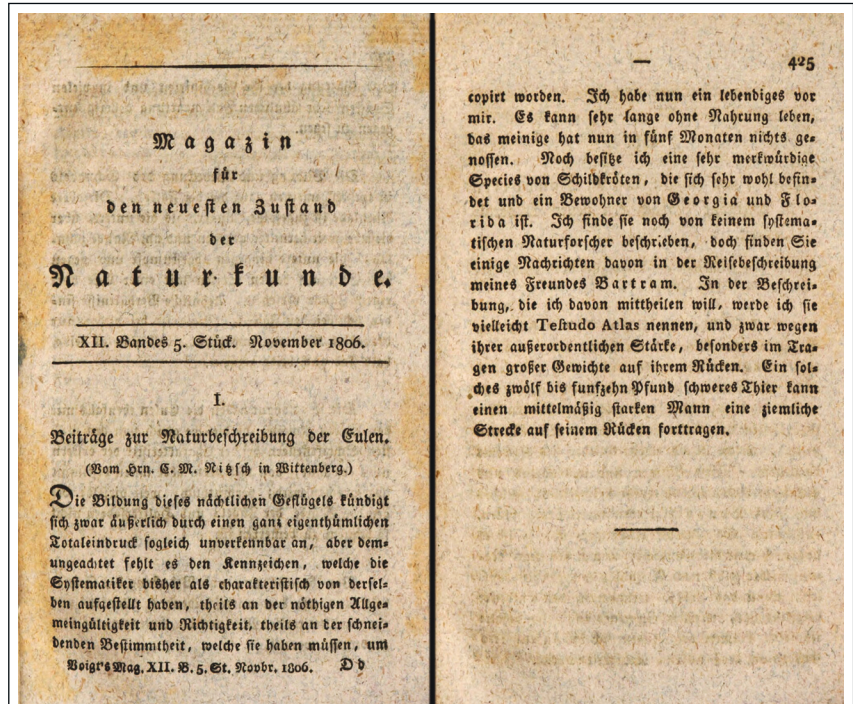


Fig. 3. *Magazin für den neuesten Zustand der Naturkunde*. Left: Title page (p. 397) of the November issue in which Barton's letter to Albers appeared. Right: Page 425 in Barton (1806a) with his discussion of *Testudo atlas* (see transcription and translation in text). Source: Bayerische Staatsbibliothek, München.

Zoological Nomenclature (Anonymous 1957) ruled that the *Travels*, including also the 1792 editions published in London and Dublin, should be rejected for nomenclatorial purposes because the work was not consistent in its application of binominal nomenclature. *Testudo polyphæmus* was the only binominal herpetological name coined by Bartram (1791) and although Harper (1940) made a case for attribution of the nomen to Bartram, even prior to the Commission's ruling, most herpetological literature credited the nomen *T. polyphæmus* to Daudin (1801) (Hobart M. Smith in Anonymous 1957). Daudin (1801) himself cited the first French translation of Bartram (1799) as his source for this species, but did not explicitly indicate that Bartram had employed the name *Testudo polyphæmus*, attributing to him only the vernacular "Gopher."

Although Barton (1806a) provided little in the way of a definition or description of *Testudo atlas*, his reference to Bartram (1791) clearly satisfies the requirements of the *International Code of Zoological Nomenclature* (Anonymous 1999), henceforth the *Code*. Specifically, Article 12.1 applies: "To be available, every new name published before 1931 must satisfy the provisions of Article 11 and must be accompanied by a description or a definition of the taxon that it denotes, or by an indication," with an indication including "a bibliographic reference to a previously published description or definition even if the description or definition is contained in a work published before 1758, or that is not consistently binominal, or that has been suppressed by the Commission"



Fig. 4. Gopher Tortoise (*Gopherus polyphemus*): Irwin County, Georgia. Photo by Dirk J. Stevenson.

(Article 12.2.1). Although Barton (1806a) proposed the name in a conditional way, saying that he may use this name in a forthcoming description, which never appeared, this does not exclude it from availability (Art. 11.5.1). Thus, the nomen *Testudo atlas* is available from this publication. It is, however, clearly a junior synonym of *Testudo polyphemus* Daudin, 1801 and, thus, does not pose a threat to the stability of this well-known American chelonian.

Testudo atlas Barton, 1806 has not been mentioned in any published synonymies of *Gopherus polyphemus* (Mertens and Wermuth 1955; Wermuth and Mertens 1961, 1977, 1996; Auffenberg 1974; Auffenberg and Franz 1978; Fritz and Havaš 2007; TTWG 2021) nor is it listed in Sherborn's *Index Animalium* (1923). Neither is Barton's letter to Albers noted in nomenclatural histories treating *Gopherus polyphemus* (Crumly 1988; Murphy 2014) or included in bibliographies of the Gopher Tortoise (Douglass 1975, 1977; Gopher Tortoise Council 2023) or of Barton's writings (Barton 1836; Ewan and Ewan 2007). Indeed, the only reference to Barton (1806a) I could locate was in Mearns (1914), which referred to another part of the letter dealing with pocket gophers and made no mention of the tortoise.

The nomen *Testudo atlas* has, however, been used for the largest tortoise that ever lived (Fig. 5), a giant (180–210 cm

carapace length) from the Late Pliocene to Early Pleistocene of the Siwalik Hills (see Kumar et al. 2020 for justification of this spelling of this geonym), Punjab, India (Lydekker 1889; TEWG 2015). The tortoise was first mentioned by Falconer and Cautley (1837:358) as *Megalochelys Sivalensis*. However, this use had been considered by TEWG (2015) to constitute a nomen nudum, that was subsequently only made available by Falconer in Murchison (1868:359). By this time though, Falconer and Cautley (1844) had employed the nomen *Colossochelys atlas* for the same species in a description that has been uniformly accepted as validly described. Most recently, however, Vlachos (2019) argued that *Megalochelys Sivalensis* Falconer and Cautley, 1837 is, indeed, *Code*-compliant and not a nomen nudum after all. Both specific epithets have been in regular use, with *sivalensis* also employed by Williams (1952), Lapparent de Broin (2002), Karl and Staesche (2007) [as *siwalensis*], Setiyabudi (2009), and Claude et al. (2011) and *atlas* by Hooijer (1971) and Auffenberg (1974).

As *atlas*, the species has been assigned variously to *Megalochelys* and *Colossochelys*, either as full genera, or as subgenera of *Geochelone* (e.g., Auffenberg 1974) or *Testudo* (e.g., Williams 1952) in the combinations *Testudo (Colossochelys) atlas* (Lydekker 1880), *Testudo*

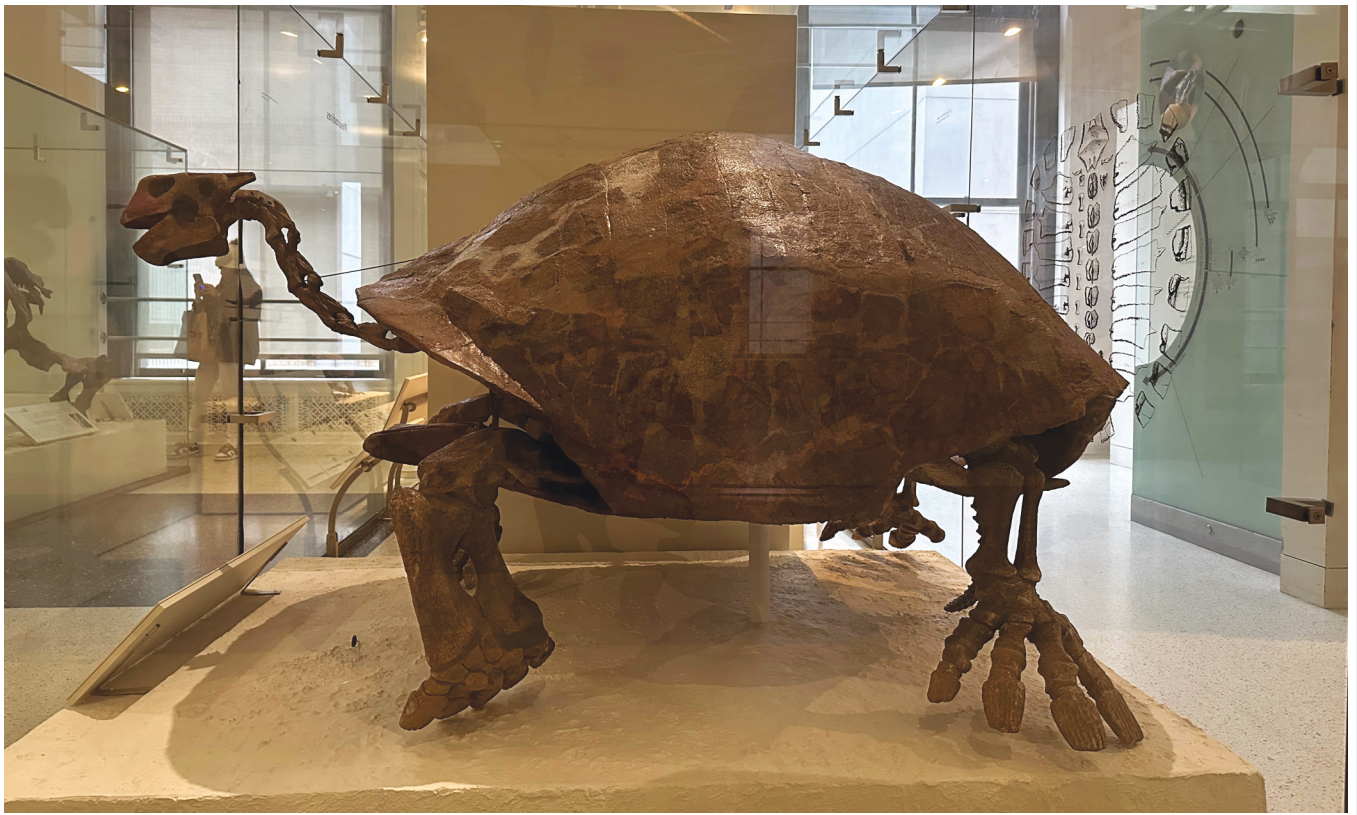


Fig. 5. *Megalocheilus atlas* (= *M. sivalensis*). Specimen AMNH 6332 on display at the American Museum of Natural History, New York. Photo courtesy of Jeffrey Weinell.

(*Megalocheilus*) *atlas* (Lydekker 1889), *Testudo atlas* (Brown 1931) and *Geochelone atlas* (Hooijer 1971). Although these combinations would represent junior secondary homonyms of *Testudo atlas* Barton, 1806 (subgeneric names are irrelevant to the homonymy; *Code* Article 57.4), the current assignment of the giant Siwalik tortoise to the genus *Megalocheilus* (e.g., TEWG 2015; Vlachos 2019) resolves this issue and based on Article 59.2 of the *Code* (Anonymous 1999), because these names are not currently allocated to the same genus, no action is required.

Recently, Frétey and Raffaëlli (2021) rediscovered another long-forgotten and rarely cited nomen that had been proposed by Benjamin Smith Barton, *Salamandra horrida* Barton, 1807. They determined that *C. horridus* (Barton, 1807) is the valid name of the type species of *Cryptobranchus* Leuckart, 1821 and that it is applicable to the Ohio/Allegheny/Susquehanna lineage of hellbender (Hime 2017). Another Barton name, *Mus Tuza*, a pocket gopher described in another letter (Barton 1806b) published in the same volume of *Magazin für den neuesten Zustand der Naturkunde* as *Testudo atlas* has engendered a good deal of controversy (Mearns 1914; Harper 1952). Modern workers appear to follow Harper (1952) in regarding Barton's name as a nomen dubium or as unavailable for unspecified reasons (Álvarez-Castañeda and Segura-Trujillo 2025), although this remains open to interpretation. Admittedly, the case of *Testudo atlas* Barton, 1806 is more of a historical footnote than an actual

problem for tortoise nomenclature, but it illustrates the fact that forgotten names still lurk in the literature and have the potential to disrupt current name usage. Barton's far-flung network of correspondents exacerbates the matter, as his letters were published in outlets all over the world (Ewan and Ewan 2007) and additional descriptions may well have gone unnoted.

ACKNOWLEDGEMENTS

I thank Dirk J. Stevenson and Jeffrey L. Weinell for kindly providing photographs used in this paper and Josef Schmidler, Scott Thomson and Ken Dodd for their feedback on the original manuscript.

REFERENCES

- Adler, K. 2007. Herpetologists of the past. Part 2. Pp. 7–273 in: K. Adler (ed.), *Contributions to the History of Herpetology*, Volume 2. Society for the Study of Amphibians and Reptiles, Saint Louis, Missouri.
- Álvarez-Castañeda, S.T. and Segura-Trujillo, C.A. 2025. Genus-level review of pocket gophers in the family Geomyidae. *Therya* 16(1):41–75.

- Anonymous. 1957. Opinion 447. Rejection for nomenclatorial purposes of the original edition published at Philadelphia in 1791 and of the editions published in London and Dublin respectively in 1792 of the work by William Bartram entitled *Travels through North and South Carolina, Georgia, East and West Florida, the Cherokee Country, the extensive territories of the Muscogules or Creek Confederacy, and the Country of the Chactaws*, as being a work in which the author did not apply the principles of binominal nomenclature. *Opinions and Declarations Rendered by the International Commission on Zoological Nomenclature* 15(12): 211–224.
- Anonymous [International Commission on Zoological Nomenclature]. 1999. *International Code of Zoological Nomenclature*, Fourth edition. International Trust for Zoological Nomenclature, London. xxix + 306 pp.
- Auffenberg, W. 1974. Checklist of fossil land tortoises (Testudinidae). *Bulletin of the Florida State Museum, Biological Sciences* 18(3):121–251.
- Auffenberg, W. and R. Franz. 1978. *Gopherus polyphemus*. *Catalogue of American Amphibians and Reptiles* 215.1–2.
- Barton, B.S. 1799. *Fragments of the Natural History of Pennsylvania*. Part First [all published]. Printed for the Author by Way & Groff, Philadelphia. xviii + 24 pp.
- Barton, B.S. 1801. *Collections for an Essay Towards a Materia Medica of the United States*. Part First. Second Edition. Printed for the Author by Robert Carr, Philadelphia. xii + 53 pp.
- [Barton, B.S.] 1806a. Auszug eines Schreibens des Herrn Professors B. S. Barton in Philadelphia and Hr. Doctor Albers in Bremen. *Magazin für den neuesten Zustand der Naturkunde Magazin für den neuesten Zustand der Naturkunde*, 12(5):423–425.
- Barton, B.S. 1806b. Von der räthfehlhaften *Siren lacertina* Linn. (pp. 486–487). Tragzeit der Wölfin. (pp. 487–488). *Mus tuza*. (p. 488). Das fossile *Mammut ohioiticum* (p. 489). Andere amerikanische sogenannte Petrefacten (p. 490). Merkwürdige eigentlich sogenannte Mineralien, die neuerlich in Nordamerika entdeckt worden (pp. 490–491). Naturhistorische Reisen in Nordamerika (pp. 491–492). *Magazin für den neuesten Zustand der Naturkunde*, 12(6):486–492.
- Barton, B.S. 1807. *Amphibiology*. *Philadelphia Medical and Physical Journal*, Supplement 2 (2):195–197.
- Barton, B.S. 1808. Some Account of the *Siren lacertina*, and Other Species of the Same Genus of Amphibious Animals. In a letter from Professor Barton, of Philadelphia, to Mr. John Gottlob Schneider, of Saxony. Jesper Harding, Printer, Philadelphia. 32 pp. 1 pl.
- Barton, W.P.C. 1836. A biographical sketch read pursuant to appointment, before the Philadelphia Medical Society, at a stated meeting, February 16, 1816, of their late president, Professor Barton. Pp. 9–34 in Barton, B.S., *Elements of Botany or Outlines of the Natural History of Vegetables*. A New Edition: Revised and Condensed, with an Account of the Life and Writings of the Author, by William P.C. Barton, M.D. Robert Desilver, Philadelphia.
- Bartram, W. 1791. *Travels through North and South Carolina, Georgia, East and West Florida, the Cherokee Country, the Extensive Territories of the Muscogules, or Creek Confederacy, and the Country of the Chactaws*. Containing an Account of the Soil and Natural Productions of those Regions; together with Observations on the Manners of the Indians. James and Johnson, Philadelphia. [2] + xxxiv + [2] + 522 pp., 8 pls., 1 map.
- Bartram, W. 1793. *William Bartram's Reisen durch Nord- und Süd- Karolina, Georgien, Ost- und West- Florida, das Gebiet der Tscherokesen, Krihks und Tschaktahs, nebst umständlichen Nachrichten von den Einwohnern, dem Boden und den Naturprodukten dieser wenig bekannten grossen Länder*. Aus dem Englischen. Mit erläuternden Anmerkungen von C. A. W. Zimmermann. *Magazin von merkwürdigen neuen Reisebeschreibungen, aus den fremden Sprachen übersetzt und mit erläuternden Anmerkungen begleitet*. Zehnter Band. In der Vossischen Buchhandlung. Berlin. [2] + xxvi + 501 pp. [pp. 497–501 numbered 465–469], 8 pls. [there is also a Wien imprint of the same year published by F. A. Schrambl. xxxix + [9] + 404 pp., 8 pls.].
- Bartram, W. 1799 [An VII]. *Voyage dans les Parties sud de l'Amérique septentrionale; savoir: les Carolines septentrionale et méridionale, la Georgie, les Florides orientale et occidentale, le pays des Cherokees, le vaste territoire des Muscogules ou de la Confédération Creek, et le pays des Chactaws; contenant des détails sur le sol et les productions naturelles de ces contrées, et des observations sur les moeurs des Savages qui les habitent*. Imprimé à Philadelphie, en 1791, et à Londres, en 1792, et trad. De l'angl. Par P. V. Benoist. Libraires Carteret et Brosson; Dugour et Durand, Paris. [4] + 457 + [1] pp., 3 pls., [4] + 436 + [1], 1 pl., 1 map.
- Brown, B. 1931. The largest known land tortoise. *Natural History* 31:183–187.
- Bynum, W.F. 1968. Johann Abraham Albers (1772–1821) and American medicine. *Journal of the History of Medicine and allied Sciences* 23(1):50–62.
- Claude, J., Naksri, W., Boonchai, N., Buffetaut, E., Duangkrayom, J., Laojumpon, C., Jintasakul, P., Lauprasert, K., Martin, J., Suteethorn, V., and Tong, H. 2011. Neogene reptiles of northeastern Thailand and their paleogeographical significance. *Annales de Paléontologie* 97:113–131.
- Crumly, C.R. 1988. A nomenclatural history of tortoises (Family Testudinidae). *Smithsonian Herpetological Information Service* No. 75. 17 pp.
- Daudin, F. M. 1801 [An X]. *Histoire Naturelle, Générale et Particulière des Reptiles; Ouvrage Faisant Suite à l'Histoire Naturelle Générale et Particulière, Composée par Leclerc de Buffon et Rédigée par C. S. Sonnini, Membre de Plusieurs Sociétés Savantes. Tome Deuxième*. F. Dufart, Paris. 432 pp., pls. XVI–XXVIII.
- Douglass, J.F. 1975. Bibliography of the North American land tortoises (Genus *Gopherus*). *Fish and Wildlife Service Special Scientific Report - Wildlife* no. 190. Government Printing Office, Washington, D.C. 65 pp.
- Douglass, J.F. 1977. Supplement to the Bibliography of the North American land tortoises (Genus *Gopherus*). *Smithsonian Herpetological Information Service* No. 39. [ii] + 18 pp.
- Ewan, J. and Ewan, N. D. 2007. Benjamin Smith Barton. Naturalist and Physician in Jeffersonian America. *Monographs in Systematic Botany from the Missouri Botanical Garden*. Volume 100. xxvi + 1128 pp.
- Falconer, H. and P. T. Cautley. 1837. On additional fossil species of the order Quadrumana from the Sewalik Hills. *Journal of the Asiatic Society of Bengal*, 6: 354–360, pl. 23.
- Falconer, H. and P. T. Cautley. 1844. [On the osteological characters and palaeontological history of the *Colossochelys Atlas*, a fossil tortoise of enormous size from the Tertiary strata of the Sewalik

- Hills in the north of India]. *Proceedings of the Zoological Society of London*, 12: 54-55, 84-88.
- Frétey, T., and J. Raffaëlli. 2021. Barton and the forgotten description of *Salamandra horrida* (Amphibia, Urodela): story of a rediscovery. *Bionomina* 25: 35-51.
- Fritz, U. & Havaš, P. (2007) Checklist of chelonians of the world. *Vertebrate Zoology*, 57:149-368.
- Gopher Tortoise Council. Gopher Tortoise Bibliography. 2023.
- Graustein, J. 1961. The eminent Benjamin Smith Barton. *Pennsylvania Magazine of History and Biography* 85(4):423-438.
- Harper, F. 1940. Some works of Bartram, Daudin, Latreille, and Sonnini, and their bearing upon Norther American herpetological nomenclature. *American Midland Naturalist* 23:692-723.
- Harper, F. 1952. History and nomenclature of the pocket gophers (*Geomys*) in Georgia. *Proceedings of the Biological Society of Washington* 65:35-38.
- Hime, P.M. 2017. *Genomic Perspectives on Amphibian Evolution Across Multiple Phylogenetic Scales*. Doctoral Dissertation, University of Kentucky. [2] + xv + 257 pp.
- Hooijer, D.A. 1971. A giant land tortoise, *Geochelone atlas* (Falconer & Cautley), from the Pleistocene of Timor. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen, Series B, Physical Sciences* 72:504-525, pls. 1-4 (published in two parts, I (pp. 504-517, pls. 1-2) and II (pp. 518-525, pls. 3-4).
- Karl, H.-V. and Staesche, U. 2007. Fossile Riesen-Landschildkröten von den Philippinen und ihre paläogeographische Bedeutung. *Geologische Jahrbücher* 98:171-197.
- Kumar, A., Patil, M. and Singh, A.N. 2020. Shivalik, Siwalik, Shiwalik or Sivalik: Which one is an appropriate term for the foothills of the Himalayas? *Journal of Scientific Research (Benaras Hindu University)* 64(1):1-7.
- Lapparent de Broin, F. de. 2002. A giant tortoise from the Late Pliocene of Lesvos Island (Greece) and its possible relationships. *Annales Géologiques des Pays Helléniques* 39:99-130.
- Lydekker, R. 1880. A sketch of the history of the fossil Vertebrata of India. *Journal of the Asiatic Society of Bengal* 49(2):8-40.
- Lydekker, R. 1889. On the land tortoises of the Siwaliks. *Records Geological Survey of India*, 22(4): 209-212, figs. 1-3.
- Mearns, E.A. 1914. The earliest systematic name for the Tuoza or Georgia pocket gopher. *Proceedings of the Biological Society of Washington* 27:102.
- Mertens, R. and Wermuth, H. 1955. Die rezenten Schildkröten, Krokodile und Brückenechsen. *Zoologische Jahrbücher Abteilung für Systematik, Ökologie und Geographie der Tiere* 83(5):323-440.
- Messer, P.C. 2022. Benjamin Smith Barton's natural history network: local knowledge and Atlantic community. Pp. 45-66 in *Networks: The Creation and Circulation of Knowledge from Franklin to Facebook*. *Transactions of the American Philosophical Society*, new series, 111(4).
- Murchison, C., ed. 1868. Palæontological memoirs and notes of the late Hugh Falconer, A.M., M.D., Vice-President of the Royal Society; Foreign Secretary of the Geological Society of London; and for many years Superintendent of the H. E. I. Company's Botanical Gardens at Suharunpoor and Calcutta. With a biographical sketch of the author. Vol. I. Fauna Antiqua Sivalensis. Robert Hardwicke, London. lvi + 590 pp.
- Murphy, R.W. 2014. Systematics of extant North American tortoises. Pp. 25-29 in Rostal, D.C., McCoy, E.D. and Mushinsky, H.R., eds. *Biology and Conservation of North American Tortoises*. Johns Hopkins University Press, Baltimore.
- Pennell, F.W. 1942. Benjamin Smith Barton as naturalist. *Proceedings of the American Philosophical Society* 86(1):108-122.
- Setiyabudi, E. 2009. An early Pleistocene giant tortoise (Reptilia; Testudines; Testudinidae) from the Bumiayu area, Central Java, Indonesia. *Journal of Fossil Research* 42(1):1-11.
- Sherborn, C.D. 1923. Index Animalium sive Index Nominum quae ab A.D. MDCLVIII Generibus et Speciebus Animalium Imposita Sunt. Section Secunda a Kalendis Ianuariis, MDCCCI usque ad Finem Decembris, MDCCCL. Part III. Index Anus—Bail. Trustees of the British Museum, London. Pp. 385-640.
- Tanner-Read, R.B. 2012. Benjamin Smith Barton, "MD": The American Performance of Scientific Authority in a Trans-Atlantic World. M.A. Thesis, The College of William and Mary. [iii] + 49 pp. Dissertations, Theses, and Masters Projects. William & Mary. Paper 1539626693.
- TEWG [Turtle Extinctions Working Group: Rhodin, A.G.J., Thomson, Georgalis, G., Karl, H.-V., Danilov, I.G., Takahashi, A., de la Fuente, M.S., Bourque, J.R., Delfino, M., Bour, R., Iverson, J.B., Shaffer, H.B., and van Dijk, P.P.]. 2015. Turtles and tortoises of the world during the rise and global spread of humanity: first checklist and review of extinct Pleistocene and Holocene chelonians. In: Rhodin, A.G.J., Pritchard, P.C.H., van Dijk, P.P., Saumure, R.A., Buhlmann, K.A., Iverson, J.B., and Mittermeier, R.A. (Eds.). *Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group*. Chelonian Research Monographs 5(8):000e.1-66.
- TTWG [Turtle Taxonomy Working Group: Rhodin, A.G.J., Iverson, J.B., Bour, R., Fritz, U., Georges, A., Shaffer, H.B. and van Dijk, P.P., eds. 2021. *Turtles of the World: Annotated Checklist and Atlas of Taxonomy, Synonymy, Distribution, and Conservation Status* (9th Ed.). *Chelonian Research Monographs*, 8, 1-472.
- Vlachos, E. 2019. On the nomenclature of the largest tortoise that ever lived: *Megalochelys sivalensis* Falconer & Cautley, 1837 vs. *Colossochelys atlas* Falconer & Cutley, 1844 (Reptilia, Testudinidae). *Bulletin of Zoological Nomenclature* 76:162-164.
- Wermuth, H. and Mertens, R. 1961. Schildkröten, Krokodile, Brückenechsen. Gustav Fischer Verlag, Jena. xxvi + [1] + 422 pp.
- Wermuth, H. and Mertens, R. 1977. Liste der rezenten Amphibien und Reptilien. Testudines, Crocodylia, Rhynchocephalia. *Das Tierreich* 100: I-XXVII + 1-174.
- Wermuth, H. and Mertens, R. 1996. Schildkröten, Krokodile, Brückenechsen. Gustav Fischer Verlag, Jena. xxvi + [1] + 506 pp.
- Williams, E.E. 1952. A new fossil tortoise from Mona Island, West Indies, and a tentative arrangement of the tortoises of the world. *Bulletin of the American Museum of Natural History* 99(9):541-560, pls. 44-47.

We suggest the following format for citing this article:

Bauer, A. M. 2025. *Testudo atlas* Barton, 1806, a long-forgotten synonym of the Gopher Tortoise (*Gopherus polyphemus*) and a senior secondary homonym of the largest tortoise that ever lived. *Bibliotheca Herpetologica* 19(7):101-107.

Herpetology in the Report of the First Scientific Expedition to Manchuokuo

C. Kenneth Dodd, Jr.

5222 N.W. 56th Court, Gainesville, Florida 32653, USA. terrapene600@gmail.com

Manchuria is a region in northeastern China that historically had been settled by the Manchu ethnic group, although the origin of the name itself is uncertain. In 1931, the Empire of Japan invaded and occupied Manchuria and in 1932 proclaimed the puppet state of Manchuokuo (spelled Manchukuo in the West) with the former Chinese Emperor Puyi as its figurative head. Puyi later was named the Emperor of Manchuria in 1934, although he wielded no political power and the “state” was firmly under Japanese control. The nation-state remained extant until the Soviet army invaded in 1945 at the end of World War II. The territory was returned to Chinese control in 1946. The First Scientific Expedition to Manchuokuo (FSEM) occurred during the transition from Han Chinese rule to Japanese rule, when Imperial Japan was interested in demonstrating to the world it could create a modern multi-ethnic Pan-Asian state (Lin, 2014). From the mid to late 1930s until the end of the war, however, conditions deteriorated toward brutality and totalitarianism, which led to the Second Sino-Japanese War.

The name Jehol is actually a romanized name for the city and province formerly known as Rehe in northeastern China; the city of Rehe is now known as Chengde. Jehol was established as a Special Administrative Unit in 1914 and a province by the Republic of China in 1923. In 1933, the Imperial Japanese Army invaded Jehol to form a buffer zone between China and the puppet state of Manchuokuo, whereupon it was subsequently annexed by the Empire of Manchuria and named as a province within the Empire. For a short time after World War II, it remained as a province of the People’s Republic of China but with slightly different borders. In 1955, Jehol Province was subsumed within Hebei Province, Liaoning Province, Tianjin, and Inner Mongolia. The First Scientific Expedition to Manchuokuo centered its activities in Jehol between Chifeng, Chaoyang, and Chengde, the largest cities at the time, with occasional forays north or south of these cities, such as to the wetlands along the Chaogedu’er River in what is today the Yudaokou Grassland Forest Scenic Park.

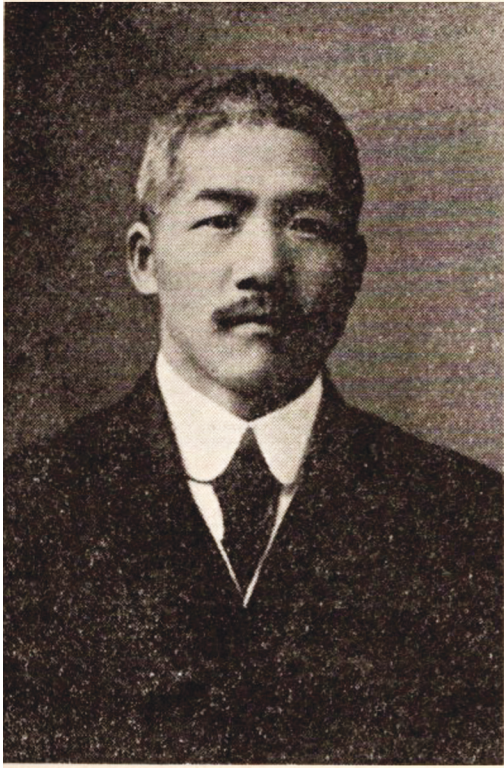
THE EXPEDITION

Imperial Japan had only recently acquired the region known as Jehol when the expedition was formed. The reasons behind the expedition were unlikely due to a benevolent need to un-

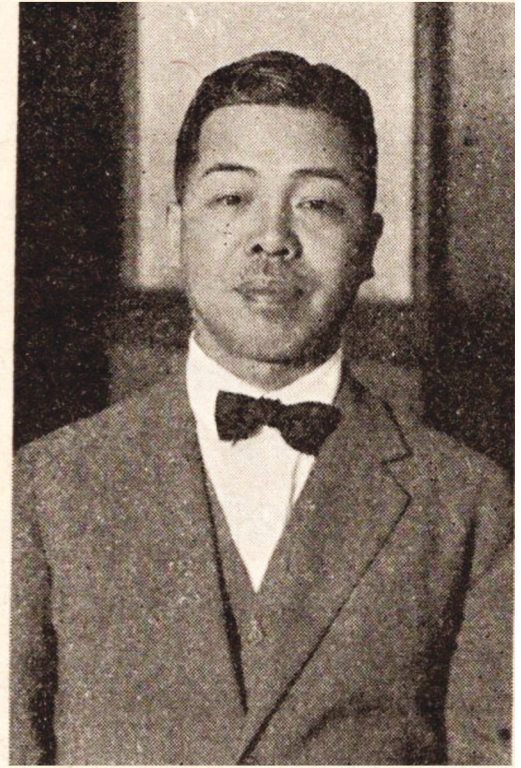
derstand the region’s natural history. The first volume in the final report makes clear that there were other reasons, including to document diseases and their insect vectors (Tokunaga, 1934; p. 53–54). Lin (2014) suggested three reasons for the expedition: 1) Politics, as a means of asserting control of an area with abundant natural resources and generating enthusiasm among the Japanese populace [i.e., it would help justify Imperial expansion as being good for Japanese with limited economic opportunities at home]; 2) Advancing the notion of transforming a backward region by a modern colonial Asian power [i.e., colonialism can be justified as benefitting the local people]; and 3) by pursuing scientific knowledge in Manchuria, the expedition was part of a power struggle in a long-standing cultural war between China and Japan [i.e., Japan wanted to assert cultural superiority over the Han Chinese who had come to dominate the Manchus]. Thus, the reasons for the expedition were complex and likely not entirely for a heuristic desire to understand the region for its own sake. Even in the West, the activities and scale of the expedition were quickly noticed (Anonymous, 1935).

The First Scientific Expedition to Manchuokuo was formed under at the behest of Viscount Akira Toki of the War Office of Japan under the leadership of Shigeyasu Tokunaga (20 August 1874 – 8 February 1940), a specialist in zoology, geology, and paleontology. Tokunaga was a Professor at Waseda University where the Report of the FSEM was published. Summaries of his scientific contributions are in Tokunaga (1985) and Ōmori (2007). An obituary appeared in the Epilogue of the report of the FSEM (Nakai, 1940), as Tokunaga died of pneumonia and heart failure while the report was being finalized. A total of 62 individuals took part in the expedition, including 21 scientists plus guards, interpreters, and drivers; the expedition was joined at various times by as many as 30 soldiers from army outposts along the way. The expedition left from Hsinking (now Changchun, capital of Jilin Province and then capital of Manchuokuo) on 2 August 1933 and returned there on 12 October. Information was included in the final report from previous paleontological excavations in June in northern Manchuokuo, hence the dates listed on the final report cover field work from June to October 1933. Publication of the report was supported by the Cultural Work Bureau of the Japanese Foreign Office. In 1937, the expedition members were awarded the Asahi Cul-

Zoological Division.



T. Mori



K. Kishida

Fig. 1. Tamezo Mori and Kyûkichi Kishida, the zoologists assigned to the First Scientific Expedition to Manchuokuo. From Tokunaga (1934).

tural Prize for their “contributions to the culture of the entire world” (Tokunaga, 1940). Although maps were not included in the final report, Flick (2018: p. 11) includes a map of Jehol and the expedition’s route through the region.

Collecting zoological specimens was the responsibility of Tamezo Mori (1884–1962), a naturalist then based at Keijô Imperial University in Seoul on the Korean Peninsula, and Kyûkichi Kishida (1888 – 1968) of the Zoological Research unit of the Department of Agriculture and Forestry (Fig. 1). Mori was primarily an ichthyologist who also published on the mammals, birds, and butterflies of Korea and Manchuria. Kishida was a naturalist who published primarily on spiders. Perhaps because of the late summer departure of the expedition, few individuals were collected for examination (measurements were taken on only 36 individual amphibians and only single individuals were observed of three of the snake species). In the introduction, Tokunaga (1934) reported that the region was quite arid and that much of the land was deforested, the result of a long history of overgrazing and tree cutting. In the northern part of Jehol, the habitats and faunas were part of the Mongolian deserts, whereas in the south, only remnants of native forest remained as refugia; wetlands

were rare and rivers shallow. The introduction to the region (Tokunaga, 1934) includes additional information on climate, topography, geology, and a rather negative assessment of the condition of the inhabitants. It concludes with 401 black and white photos (mostly six to a page) of the expedition members and the people and landscapes of the country. These photos effectively illustrate the extreme habitat degradation and aridity of the region in 1933.

THE REPORT

The final report of the FSEM was issued in parts from July 1934 through May 1940. It was divided into six sections: I. General Report (Fig. 2), II. Geology (including paleontology), III. Geography, IV. Botany, V. Zoology, and VI. Anthropology. The final report also included an Epilogue by Sigeyasu Tokunaga, an obituary of him, and a general index in a separate issue (Fig. 3). Sections were divided into a total of 25 volumes comprising 3,937 pages and 820 plates, many of them in color. Sections and volumes were not published sequentially. Instead, volumes were published as they were completed, so that volume numbering does not group

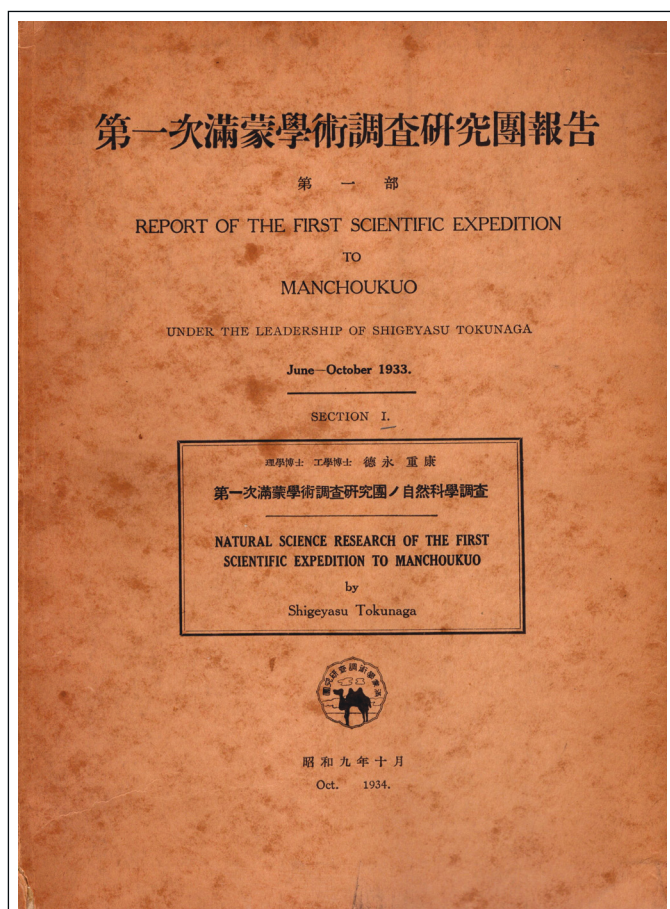


Fig. 2. Report of the First Scientific Expedition to Manchoukuo. Section 1. Natural Science Research of the First Scientific Expedition to Manchoukuo. Cover.

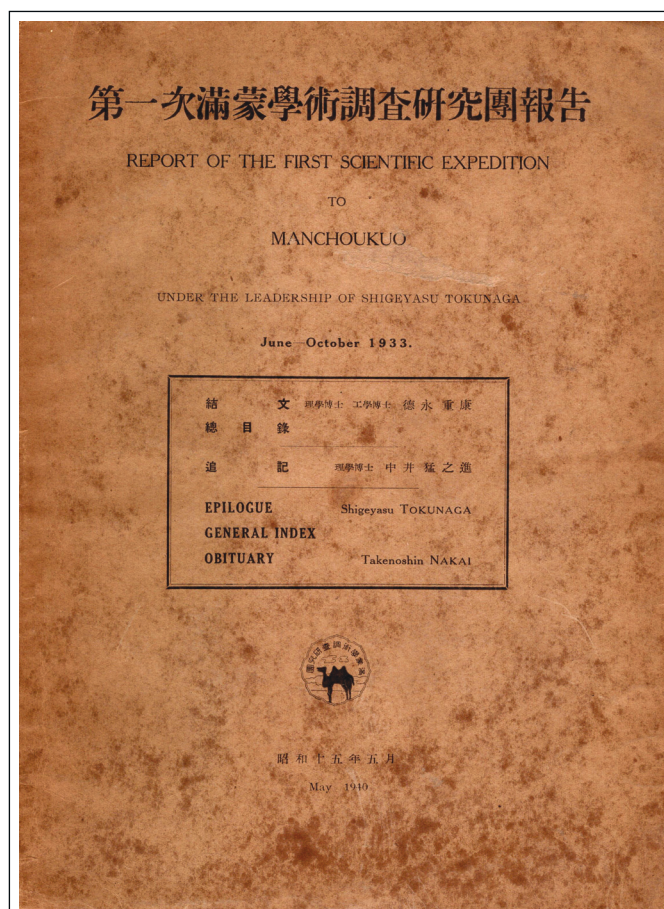


Fig. 3. Report of the First Scientific Expedition to Manchoukuo. Epilogue. Cover. The Epilogue contains a complete listing of all the volume titles, authors, and dates of issue.

taxa together by section or date. For example, the volume on amphibians and reptiles was published in December 1935 as Section V, Division II, Part II, well before the completion of much of the final report. All volumes were published in soft cover by the Office of the Scientific Expedition to Manchoukuo, Faculty of Science and Engineering, Waseda University, Tokyo. The reports were published in Japanese then translated into English within the volume either in their entirety (e.g., the volume on amphibians and reptiles) or with an extended summary. Pages are numbered sequentially and include both the Japanese and English accounts (i.e., a 70-page report might roughly have 35 pages in Japanese and 35 in English).

Some sections of the report were written by members of the expedition, but others were delegated to scientists with expertise in particular taxa. The report on the amphibians and reptiles (Fig. 4) was authored by Yaichirô Okada (24 June 1892 – 28 April 1976; Fig. 5), then at the Zoological Institute, Tokyo Higher Normal School, who was considered one of Japan's leading zoologists (Adler, 1989). By the time of the expedition, Okada had already published important monographs on Japanese frogs and reptiles. Okada was commissioned by the expedition's leader, Dr. Shigeyasu Tokunaga,

to examine and identify the specimens obtained. Okada provided very detailed descriptions of the specimens, including complete species synonymies, characteristics, coloration, localities where observed, the species' distribution throughout its range, and remarks. Additional information on ecology and distribution was provided by professor Mori, who was credited within the accounts for his observations. Color plates, credited to S. Suzuki, were placed separately at the end of the amphibian and reptile accounts (Figs. 6–13). Additional information on Professor Okada is in Hubbs and Kuroshima's (1977) obituary of him.

THE HERPETOFAUNA

The FSEM reported six species of amphibians and 10 species of reptiles from Jehol (Table 1). No salamanders were found. The frogs *Bombina orientalis*, *Dryophytes japonicus*, and *Kaloula borealis* are now known to be present but were not observed (Fei et al., 2012; Borzeé, 2024). One lizard, *Scincella modesta*, and three snakes, *Euprepophis mandarinus*, *Oocatochus rufodorsatus*, *Orientocoluber spinalis*, also were not recorded, although they are present on the western side

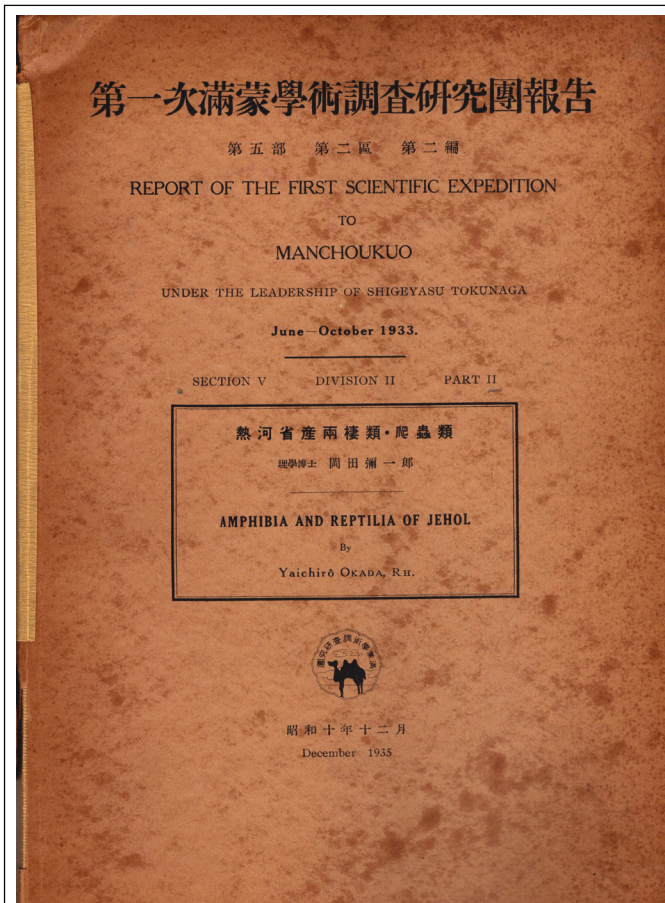


Fig. 4. Report of the First Scientific Expedition to Manchuokuo. Section V, Division II, Part II. Amphibia and Reptilia of Jehol. Cover. The amphibian (Article 1) and reptile (Article 2) sections were written separately but published together in a single volume.



Fig. 5. Yaichirō Okada. 1963. Clark L. Hubbs Papers, University of California-San Diego Digital Collections. According to the UC-San Diego Library, the use of this digital copy is permitted in support of research, teaching, and private study.

of the Bohai Sea (Li et al., 2021). No fossil amphibians or reptiles were found based on the summer fieldwork in northern Manchuokuo by Tokunaga in June 1933. Shikama (1959) later noted that fossils of *Pelodiscus maackii* were found in Quaternary deposits near where Tokunaga had worked.

COMMENTS ON NOMENCLATURE

***Bufo bufo asiatica*.** The common Asiatic Toad, historically referred to as *Bufo gargarizans*, is now known to comprise a species complex with many described species and subspecies over the last few decades, some of which are currently considered valid and some not (see Fu, 2023, for review). Based on the analyses summarized by Borzeé (2024) and the discussion on *Bufo gargarizans* Cantor, 1842 in Amphibian Species of the World 6.2, an Online Reference (<https://amphibiansoftheworld.amnh.org/Amphibia/Anura/Bufo/Bufo-gargarizans>), the FSEM likely encountered the nominal taxon of the complex, *B. gargarizans*, in Jehol.

***Rana amurensis*, *R. asiatica*, *R. chensinensis*.** Eastern Asian brown frogs are very difficult to identify, as there is much

phenotypic variation among them (see photos in Fei et al., 2012) and the discussion on *Rana chensinensis* David 1875 in Amphibian Species of the World 6.2, an Online Reference (<https://amphibiansoftheworld.amnh.org/Amphibia/Anura/Ranidae/Rana/Rana-chensinensis>). Okada (1935) mentioned three species of brown ranids of similar appearance as occurring in Jehol. The “Brown Frog” group of Asian ranids is phylogenetically close to *R. amurensis*, two individuals of which were recorded by the FSEM at Ling-yuan in Jehol. *Rana asiatica* as currently recognized, however, only occurs from southern Kazakhstan through Kyrgyzstan to central Xinjiang (China) and thus is far distant from Jehol. According to Fei et al. (2012) and Borzeé (2024), *R. amurensis* also should not occur there.

The description and illustration of *R. asiatica* in Okada (1935a) suggests a frog more similar to the species currently recognized as *R. dybowskii* (see accounts and distribution maps in Fei et al., 2012). Eleven individuals were captured at two locations. However, Fei et al. (2012) and Borzeé (2024) record *R. dybowskii* as occurring south of Jehol in Shandong Province. The widespread *R. chensinensis* also was recorded by FSEM in Jehol (nine individuals at five locations), with

第二圖版

PL. II



まんしゅうひきがへる *Bufo raddei* STRAUCH. ×1.

[Shirô SUZUKI del.]

Fig. 6. *Bufo* [=Strauchbufo] *raddei*. Plate II in FSRM (Amphibia).

第四圖版

PL. IV



とのさまがへる *Rana nigromaculata nigromaculata* HALLOWELL. ×1.

[Nanpei MIZUSHIMA del.]

Fig. 7. *Rana nigromaculata* [=Pelophylax *nigromaculatus*]. Plate IV in FSRM (Amphibia).

第六圖版

PL. VI



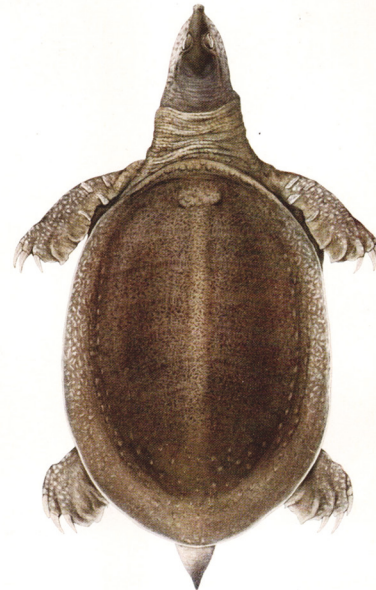
しなあかがへる *Rana chensinensis* DAVID. ×1.

[Nanpei MIZUSHIMA del.]

Fig. 8. *Rana chensinensis*. Plate VI in FSRM (Amphibia).

第九圖版

PL. IX



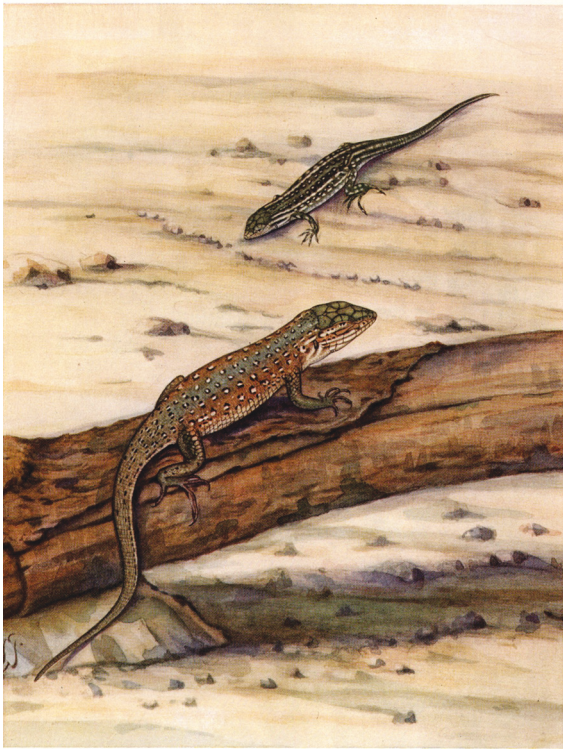
しなすつぽん *Amyda sinensis* (WIEGMANN). ×2/3.

[S. SUZUKI del.]

Fig. 9. *Amyda* [=Pelodiscus] *sinensis*. Plate IX in FSRM (Reptilia).

第二圖版

PL. II



へうもんかへび *Eremias argus* PETERS. $\times 1$.
[S. SUZUKI del.]

Fig. 10. *Eremias argus*. Plate II in FSRM (Reptilia).

第三圖版

PL. III



しなとかげ *Eumeces pekinensis* STREJNEGER.
1. 若體 (Young). 2. 成體 (Adult).

[S. SUZUKI del.]

Fig. 11. *Eumeces pekinensis* [= *Plestiodon capito*].
Plate III in FSRM (Reptilia)

第四圖版

PL. IV



たいりくやまがし *Natrix tigrina lateralis* (BERTHOLD). $\times 1$.
[S. SUZUKI del.]

Fig. 12. *Natrix tigrina lateralis* [= *Rhabdophis lateralis*].
Plate V in FSRM (Reptilia)

第八圖版

PL. VIII



しべりあまむし *Agkistrodon halys* (PALLAS). $\times 3/4$.
[S. SUZUKI del.]

Fig. 13. *Agkistrodon halys* [= *Gloydus halys*].
Plate VIII in FSRM (Reptilia)

Table 1. Amphibians and Reptiles of Jehol (Manchoukuo). See text for additional comments on nomenclature. Plates in the FSRM are numbered in Roman numerals; Arabic numbers refer to this article.

Okada 1935	Current Name	Figure No.
Amphibians		
<i>Bufo bufo asiaticus</i>	<i>Bufo gargarizans</i>	I
<i>Bufo raddei</i>	<i>Strauchbufo raddei</i>	II, III, 6
<i>Rana nigromaculata nigromaculata</i>	<i>Pelophylax nigromaculatus</i>	IV, 7
<i>Rana amurensis</i>	<i>Rana chensinensis</i>	V
<i>Rana chensinensis</i>	<i>Rana chensinensis</i>	VI, 8
<i>Rana asiatica</i>	<i>Rana chensinensis</i>	VII
Reptiles		
<i>Gekko swinhonis</i>	<i>Gekko swinhonis</i>	I
<i>Phrynocephalus frontalis</i>	<i>Phrynocephalus frontalis</i>	I
<i>Eremias argus</i>	<i>Eremias argus</i>	II, 10
<i>Eremias argus barbouri</i>	<i>Eremias argus</i>	
<i>Eumeces pekinensis</i>	<i>Plestiodon capito</i>	III, 11
<i>Natrix tigrina lateralis</i>	<i>Rhabdophis lateralis</i>	IV, 12
<i>Dinodon rufozonatum rufozonatum</i>	<i>Lycodon rufozonatus</i>	V
<i>Elaphe schrenckii anomala</i>	<i>Elaphe anomala</i>	VI
<i>Elaphe dione</i>	<i>Elaphe dione</i>	VII
<i>Agkistrodon halys</i>	<i>Gloydus halys</i>	VIII, 13
<i>Amyda sinensis</i>	<i>Pelodiscus sinensis</i>	IX, X, 9

all three brown frog species observed at Ling-yuan. The collector, Tamezo Mori, noted that “*R. asiatica*” and *R. chensinensis* were found sympatric in the same habitats, thus further complicating the identification of these variable species by Okada, who worked only from preserved specimens. It is likely that all three “species” of brown frogs collected in Jehol by Mori should be referred to the highly polymorphic *R. chensinensis*.

***Eremias argus*, *E. argus barbouri*.** Although treated in separate accounts, Okada recognized similarities between nominal *E. argus* and individuals described by Schmidt (1925) as *E. barbouri*. Schmidt’s characters used to distinguish between the two species are variable and overlap, and Okada relegated *E. barbouri* to subspecific status under *E. argus*. Tian et al. (2024) considered *E. a. barbouri* to be an invalid taxon.

***Agkistrodon halys*.** In Okada’s era, *Agkistrodon* (= *Gloydus*) *halys* was considered to occur throughout much of central Asia ranging from Kazakhstan to the Pacific Coast in China. Recent molecular data have confirmed that this species is instead a complex of species, some of which are wide-ranging while others are narrowly distributed (Shi et al., 2021). Comparing the results of Shi et al. (2021, p. 102) with the route of the FSEM (Flick, 2018, p. 11), the species most likely en-

countered by the FSEM at Mt. Wu-ling-shan and identified by Okada was *Gloydus halys*.

CONCLUSION

The First Scientific Expedition to Manchoukuo provided a great amount of information to the Imperial Japanese government about the people, potential diseases and insect vectors, topography, geology, and natural resources of what was then a very poorly known part of Asia, at least to the outside world. Indeed, the need for such information may have been a driving motivation behind the expedition, rather than a pure interest in natural history (Lin, 2014). The physical conditions with respect to weather conditions (reported as “scorching”), travel (there were no roads), and supply logistics were difficult. Security was a problem for expedition members, as the Japanese invasion had stimulated opposition from the local populace, the Chinese government, and bandits (often former soldiers that had fought the Japanese in Manchuria). The expedition had to rely heavily on support from the local Kwantung Army and the Foreign Office.

Judging from the photographs, collecting conditions were harsh, particularly so late in the year when habitats already were highly degraded after a summer of high heat and aridity. It is thus not surprising that some species of amphibians and reptiles were not observed and that few individuals were collected. In terms of results, Okada confirmed the synonymy of *E. barbouri* with *E. argus* and the FSEM provided information on distribution, but no important herpetological discoveries resulted. Still, this was the first major attempt to document the herpetology of this little-explored region, and the expedition formed the basis for later research by Chinese scientists. The plates of this little-known report are beautiful, carefully produced, and merit recognition.

ACKNOWLEDGEMENTS

I thank Anthony Lau for his comments on the manuscript.

REFERENCES

- Adler, Kraig K. 1989. Okada, Yaichirō (1892–1976). Pp. 108–109 *In: Contributions to the History of Herpetology, Volume 1*. Society for the Study of Amphibians and Reptiles, Ithaca, New York.
- Anonymous. 1935. A Japanese scientific expedition to Manchoukuo. *Nature* 135:179–180.
- Borzeé, Amaël. 2024. *Continental Northeast Asian Amphibians. Origin, Behavioural Ecology, and Conservation*. Elsevier Academic Press, London. vii + 231 p.
- Fei, Liang, C. Ye, and J. Jiang. 2012. *Colored Atlas of Chinese Amphibians and their Distributions*. Sichuan Publishing House of Science & Technology, Chengdu, Sichuan. 620 p.
- Flick, Ulrich. 2018. Die “Erste wissenschaftliche Expedition in die Mandschurei-Mongolei” von 1933 – Der historische Hintergrund. *Academic Research Society of Tohoku Gakuin University, College of Liberal Arts*, Issue 180:1–17.

- Fu, Jinzhong. 2023. *Bufo gargarizans*: What's in a name? *Asian Herpetological Research* 14:246–255.
- Hubbs, Carl L. and K. Kuroshima. 1977. Yaichiro Okada, 1892–1976. *Copeia* 1977:206–207.
- Li, Jianli, P. Li, and Y. Lu (eds.). 2021. *Atlas of Amphibians and Reptiles of Bohai Sea Rim in China*. Dalian Municipal Government, Liaoning Province, China. 250 p. [in Chinese and English]
- Lin, Chih-Hung. 2014. The exploration of Empire: The Manchuria-Mongolia Academic Research Group in Rehe in 1933. *Jinan Journal of History* 17:11–41. [in Chinese]
- Nakai, Takenoshin. 1940. Obituary. Pp. 5–6 In: *Report of the First Scientific Expedition to Manchuokuo. Epilogue*. Office of the Scientific Expedition to Manchoukuo, Faculty of Science and Engineering, Waseda University, Tokyo.
- Okada, Yaichirō. 1935. Amphibia and Reptilia of Jehol. Report of the First Scientific Expedition to Manchoukuo. Section V, Division II, Part II: Amphibia 1–47, 7 plates; Reptilia 1–76, 10 plates. [Amphibia was published in November; Reptilia in December]
- Ōmori, Masae. 2007. Dr. Tokunaga Shigeyasu: Prodigy geologist graduated the course of zoological sciences of Tokyo Imp. Univ. *Earth Science (Chikyu Kagaku)* 61: 73–75. [in Japanese]
- Schmidt, Karl Patterson. 1925. New Chinese amphibians and reptiles. *American Museum Novitates* (175):1–3.
- Shi, Jing-Song, J.-C. Liu, R. Giri, J.B. Owens, V. Santra, S. Kuttalam, M. Selvan, K.-J. Guo, and A. Malhotra. 2021. Molecular phylogenetic analysis of the genus *Gloydus* (Squamata, Viperidae, Crotalinae), with description of two new alpine species from Qinghai-Tibet Plateau, China. *ZooKeys* 1061:87–108.
- Shikama, Tokio. 1959. The Quaternary Period in Manchuria. *International Geology Review* 1(8):14–39.
- Tian, Lili, R. Xu, D. Chen, N.B. Ananjeva, R.M. Brown, M.-S. Min, B. Cai, B. Mijidsuren, B. Zhang, and X. Guo. 2024. Range-wide phylogeography and ecological niche modeling provide insights into the evolutionary history of the Mongolian Racerunner (*Eremias argus*) in northeast Asia. *Animals* 14:1124.
- Tokunaga, Shigemoto. 1985. Life of Shigeyasu Tokunaga. *Journal of Geography (Chigaku Zasshi)*. 94:194–196. [in Japanese]
- Tokunaga, Shigeyasu. 1934. *Report of the First Scientific Expedition to Manchuokuo*. Section 1. *Natural Science Research of the First Scientific Expedition to Manchuokuo*. Office of the Scientific Expedition to Manchoukuo, Faculty of Science and Engineering, Waseda University, Tokyo. 76 p. + plates.
- Tokunaga, Shigeyasu. 1940. *Report of the First Scientific Expedition to Manchuokuo. Epilogue*. p. 1–4.

We suggest the following format for citing this article:

Dodd, C. K. Jr. 2025. Herpetology in the Report of the First Scientific Expedition to Manchuokuo. *Bibliotheca Herpetologica* 19(8):108–115.

Science, Myth, and Otherness: Herpetological Readings of Linnaeus's Lapland Journal

Esteban O. Lavilla

UEL - CONICET/Fundación Miguel Lillo
Miguel Lillo 251, 4000 - San Miguel de Tucumán, Argentina
eolavilla@gmail.com

After a turbulent beginning to the 18th century—marked by wars, famine, plague, and foreign invasions—Sweden began a slow process of reconstruction in 1721. The collapse of its imperial ambitions at the Battle of Poltava (1709), combined with a drained treasury and the outflow of precious metals through imports and smuggling, had left the kingdom in a precarious state. It was in this context that Carl Linnaeus (1707–1778) emerged, a figure who would not only reshape natural science but also wield considerable influence on Swedish economic policy well into the 1770s (e.g., Andersson, 1956; Roberts, 1986; Kouri & Olsen, 2016).

Linnaeus promoted an innovative idea for the time: to reduce imports by identifying and acclimatizing useful plants from abroad, making them grow in the harsher environments of the Baltic states. The utopian vision of cultivating coffee, tea, or bananas in Sweden gained strong support between the 1740s and 1760s from the court, parliament, universities, academies, and scientific societies. However, after his death, the project fell into disrepute and was eventually forgotten (e.g., Hodacs, 2023; Koerner, 1999; Müller-Wille, 2003; Müller-Wille & Charmantier, 2012).

To achieve this goal, Linnaeus and his select group of students undertook scientific expeditions both in Sweden and across the globe. Their twin objectives were to understand the country's ecology and to collect seeds and plants suitable for cultivation. These journeys also produced a wealth of information on plants, animals, minerals and human societies from all corners of the world, meticulously recorded under Linnaeus's guidance¹. Some of these travel narratives were published soon after the expeditions ended, while others remained in manuscript form until the late 20th or early 21st century². Today, the field notes of Linnaeus's students are available in a nearly complete collection edited by Lars Hansen (2007–2012), but Linnaeus's own travel accounts remain scattered and less accessible.

Between 1732 and 1749, Linnaeus embarked on five major journeys through Sweden³: to Lapland (1732), Dalarna (1734), the Baltic islands of Öland and Gotland (1741), Västergötland⁴ (1746), and Scania (1749). Only the accounts of the last three were published in his lifetime (Linnaeus

1745, 1747, 1751). The earliest of these expeditions—the Lapland journey—was introduced to readers not in Swedish but in English, when James Edward Smith published his translation in 1811, drawing directly from Linnaeus's youthful manuscript (Linnaeus, 1811)⁵. It would take nearly eighty more years before the original text, along with the Dalarna notes⁶, appeared in Swedish, thanks to Ewald Ährling's 1889 edition (Linnaeus, 1889). As Casson observes (Linnaeus 2007: 268), the Dalarna material is not a travel narrative in the usual sense, but rather a dense and technical set of observations on mining and metallurgy, likely compiled for private use rather than public readership.

This article focuses solely on the 1732 Lapland expedition—Linnaeus's first and most iconic journey. It marked the transformation of the student into a field naturalist and left a lasting imprint on his scientific development. The journey was approved by the Royal Society of Sciences in Uppsala, following a proposal Linnaeus submitted on 15 December 1731 (Old Style calendar⁷), outlining the scientific and economic value of exploring one of Sweden's least known regions. He also described the ideal qualities of the explorer: Swedish, young, healthy, tireless, unattached, single, a naturalist and physician, well-versed in the three kingdoms of nature, knowledgeable in natural history, and a skilled draughtsman. Linnaeus admitted to possessing only eight of these⁸. The content of this article is based on the manuscript of the *Iter Lapponicum* held at the Linnean Society of London (Linnaeus, 1732a, b) and on the transcription prepared by Ährling (Linnaeus, 1889).

The expedition began on 12 May 1732 in Uppsala and ended there on 10 October of the same year. Linnaeus was granted 400 copper dalers for the trip⁹ (a notable reduction from the 600 originally requested¹⁰). Upon his return, he submitted a detailed report dated 9 November¹¹, which included some exaggerations (such as distances traveled) and a fabricated visit to Caituma (entry dated 1 July) (Blunt, 2001; Gourlie, 1953; Koerner, 1999)¹².

This essay compiles and comments on all references to amphibians and reptiles found in the Lapland journal. Though generally brief and incidental, these observations offer insights into local fauna, popular beliefs, and Linnaeus's

early zoological thinking. Each reference includes the date, locality, and page number of the relevant source. Dates are preserved as they appear in the original manuscript and have not been adjusted to the Gregorian calendar adopted by Sweden in 1753.⁷

A – QUAERENDA

Before the diary proper begins, two pages (folios 31–32 in Linnaeus, 1732a) list 76 items to be investigated (*quaerenda*), almost certainly written before Linnaeus departed from Uppsala. An additional 14 queries, recorded during the journey and bound separately on folio 30 at the beginning of the manuscript, complement this list. References to amphibians and reptiles appear in items 1, 26, and 51 of the *quaerenda*:

1. Are there fleas, lice, bedbugs, frogs, snakes, etc., here?
26. Quadrupeds: reindeer, elk, wolves, beavers, foxes, martens, squirrels, ermines, Norwegian mice or lemmings. Are there mice, hares, frogs and snakes, lizards, lynxes? How many? Are there lambs, cows, badgers, horses (smaller?), goats, deer, cats, hedgehogs, wolves, bears, wild boars, moles?
51. Are there water serpents four *alnar*¹³ long in Lake Enara¹⁴, as reported in an Italian book?¹⁵

This initial list—shaped by doubt, curiosity, and rumor—reveals that Linnaeus expected to encounter amphibians and reptiles in Lapland. He not only inquires about their general presence but also notes reports of unusually large aquatic snakes. The near-total absence of such animals in the territory explored thus becomes a meaningful finding, one Linnaeus marks with disappointment in the entry for 7 June (see below). Nevertheless, this empirical void will be filled with images, associations, and accounts that place herpetological creatures at the heart of the young Linnaeus's scientific imagination.

2 June – Lycksele

Regarding the clothing of the people of Lapland, he writes:

“... Their outer tunic¹⁶ is open in front down to the middle of the chest¹⁷, below which part of it is fastened with hooks down to the base of the sternum¹⁸. Consequently, the chest remains bare, and due to the effects of the sun outdoors and the smoke indoors, it is brown in color and has the appearance of toad skin...”.

3 June – Lycksele

Linnaeus is exhausted from traveling through marshy terrain, where the ice has not yet fully melted, and he is unable to find an inhabited dwelling for shelter or food. He stops along the road, lights a fire to warm himself and dry his soaked clothes,

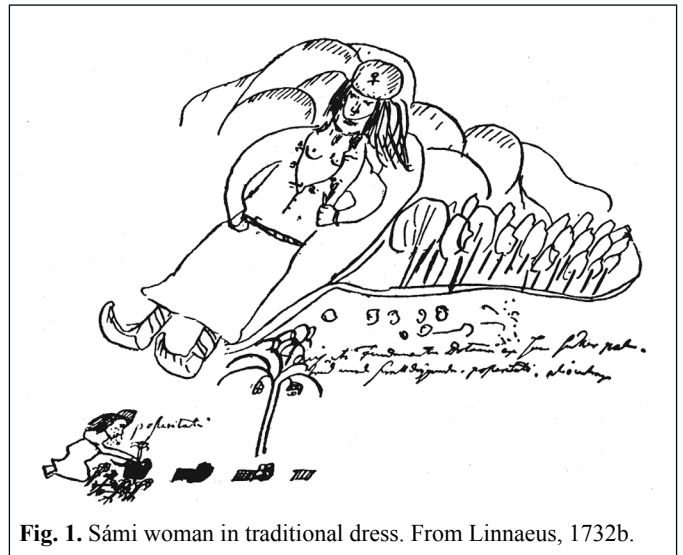


Fig. 1. Sámi woman in traditional dress. From Linnaeus, 1732b.

and sends a Sámi guide to search the region for any nearby settlers. He notes in his journal:

“... I waited for the messenger until two in the afternoon; he returned worn out from fatigue and had searched the huts in vain. With him came a person whom I could not at first tell whether it was a man or a woman; I do not think the poet could have given a better description of a Fury¹⁹, and one might believe she came from the Styx²⁰. She looked rather small; her face was brown and blackened by smoke; her eyes were brown and shining, her eyebrows black, and her pitch-black hair hung from her head, upon which she wore a red, flat cap. Her skirt was grey, and from her chest, which resembled frog skin, hung two long breasts of the same skin, adorned with bronze rings. Around her chest she wore a belt, and on her feet, boots. I was frightened by her first glance...” (Fig. 1).

The descriptions from 2 and 3 June verge on ethnography and horror. In both passages, the body of the Sámi woman²¹ is animalized, dehumanized, associated with the vicious, the dark, and the primitive. Read today, this passage invites a critical reflection on the position of the white European naturalist in relation to the Indigenous peoples of the North: a gaze which, even when disguised as science, exoticizes and eroticizes from a colonial distance²².

7 June – Lycksele

“... In Lapland, fleas are scarce, there are no bedbugs, although lice are plentiful; but there are neither frogs nor snakes...”²³

12 June – Lycksele

Confronted with a flower of striking beauty, Linnaeus compares it to the charms of the virgin Andromeda, including in



Fig. 2. Andromeda: Mythological and real, figurative and represented. From Linnaeus, 1732a.

his diary a drawing that juxtaposes the observed reality (the flower threatened by a salamander or lizard) with the legend (Andromeda threatened by a dragon) (Figs. 2 and 3).

“... *Chamaedaphne* of Buxb.²⁴ or *Erica palustris pendula*, fl: petiolo purpur.²⁵ was at that moment in its greatest splendor, decorating the marshy grounds in the most pleasing manner. The flowers are almost blood-red before opening, but when fully developed, the corolla is flesh-colored. I doubt that the art of any painter could so happily imitate the beauty of a woman’s delicate complexion; much less could any artificial color on a face withstand comparison with this charming flower. As I gazed upon it, I could not help but think of the Andromeda described by the poets²⁶, and the more I reflected on their descriptions, the more applicable they seemed to this little plant before me—so much so that if those poets had seen it, they could hardly have invented a better fable. Andromeda is depicted by them as a virgin of the most exquisite and incomparable charms, but that grace remains in its

perfection only while she preserves her virginal purity (just as happens with this plant), now preparing to celebrate her nuptials. This plant is always fixed to a small grassy mound in the midst of the marshes, just as Andromeda was chained to a rock in the sea that bathed her feet, as freshwater does its roots. Little by little, she becomes surrounded by dragons and venomous creatures—that is, the mischievous toads and frogs that in spring invade the surrounding waters and, when mating, splash water and mud onto her leaves and stems. She, standing like a distressed maiden, sadly bows her head. Thus, she inclines her pink flower heads²⁷, which grow ever paler; the heads fade more and more, which is why I call her Andromeda, with sharp leaves²⁸. As she is entirely flesh-colored, and the neck is exposed, hence the epithet *carneus*²⁹.”

Here, frogs and toads are not objects of zoological inquiry but figures of unbridled desire, contamination, and threat to the virginal integrity of the maiden-flower. This intersection of botany, eroticism, and batrachology—hybrid in both language and reference—foreshadows the allegorical uses Linnaeus would later make in his *Systema Naturae*, where he would also draw on sexual metaphor to describe reproductive functions. The parallel with the passage about his encounter with a Sámi woman cannot be ignored: both are female figures surrounded by, or associated with, amphibian elements. Yet while the mythological maiden-plant is beheld with aesthetic desire, the real woman is viewed with fear and repulsion.

Finally, Linnaeus includes—without expressing any contrary opinion—two comments on local beliefs:

30 May – Lycksele

Just arrived in Lycksele, Linnaeus is received by the Pastor and his wife in a church he describes as miserable. During the Pentecost service, at which only women had attended be-



Fig. 3. Linnaeus’s drawing (Fig. 2) appears to reference engravings from illustrated editions of Ovid’s *Metamorphoses* depicting Andromeda’s rescue by Perseus. Two examples with stylistic similarities are in Tournes (1557: 55) (left), and in Posthius (1563: 57) (right).

cause the men were occupied with pike fishing, there was one woman who displayed a peculiar condition:

“... Here there was a woman who groaned because she believed she had frogs in her stomach, since the previous spring she had drunk their eggs. She felt there were three, and both she and those nearby heard them croaking. Her discomfort was somewhat relieved by drinking vodka³⁰. Salt did not kill them. Someone—who a few years before had suffered the same problem—had taken three drams of *nux vomica*³¹, but without success; I advised her to ingest tar, but she had already done so and vomited it up immediately...”

Here, the frog inhabits not the swamp, but the body itself, becoming both a symptom and a symbol of an internal disturbance that evokes the fantastic. Interestingly, Linnaeus adopts a more descriptive than critical stance, recording the belief without explicitly refuting it. Not only does he refrain from ridiculing it, but he even suggests the ingestion of tar as a potential remedy. This curious passage led Smith (Linnaeus, 1811) to develop an extensive footnote, in which he observes that “...Linnaeus writes as if he did not absolutely disbelieve the existence of these frogs, which were as much out of their place as Jonah in the whale’s belly...”.

5 June – Lycksele

Reindeer are a fundamental element in the life of the Sami, and Linnaeus devotes many observations to them in his journal. Regarding their diet, he describes the suffering of these animals when a frost freezes the mountain lichens³² that make up their main winter food. He then remarks on a curious dietary habit:

“...Reindeer³³ also eat toads and snakes, and even lemmings³⁴; they often pursue them so far that they lose their way home, as happened some years ago, when they came down in great numbers from the mountains...”

This claim contradicts the usual image of the reindeer as a herbivore and, quite unexpectedly, connects it to the herpetological food chain. While it may reflect a local belief or a misinterpreted observation, its inclusion in the journal suggests Linnaeus’s interest in the anomalous—what escapes the predictable order.

17 June – Pithoea

Linnaeus entered the territory of Pithoea on June 13, beginning a period of exploration that would extend until the 21st. On the 17th, he recorded an entomological observation with batrachological overtones, which is transcribed here:

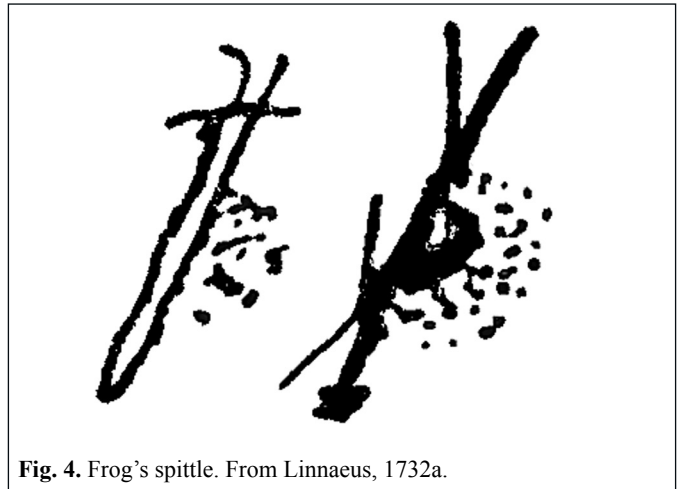


Fig. 4. Frog’s spittle. From Linnaeus, 1732a.

“...Although one walked diligently through the surroundings, there was nothing particularly noteworthy to observe, except that all over the grass there was something resembling saliva, which common folk call ‘frog’s spittle’. But when one wipes it away, there is only a small, brightly colored insect, like a tiny grasshopper, though still immature—a clear sign that it will indeed become such an insect, though for now it cannot yet leap. I wiped off the liquid and left the little creature where it was. An hour later, when I returned to the spot, there was once again a swollen foam just like before, a sign that it comes from the same insect, which blows (forms) it and thus protects itself from the intense heat of the sun, which would otherwise quickly dry out its delicate body...”

Here, Linnaeus precisely describes a common phenomenon in boreal meadows: a foamy substance on the grasses, popularly known as “frog’s spittle”³⁵ (Fig. 4), but which he correctly identifies as the secretion of an insect. Although this is a scientific correction, the persistence of the name reveals the symbolic place frogs occupy in popular culture: they are associated with moisture, viscosity, and marginality. The frog, as a symbolic form, exceeds its zoological status and becomes a cultural category.

FINAL WORDS

The *Iter Lapponicum* is both a crucial source for the history of biology and a dense cultural document, in which the few herpetological references reveal the tensions between empiricism, myth, and the perception of the Other in eighteenth-century science. Beyond their anecdotal value, the mentions of toads, frogs, lizards, and snakes allow us to trace the symbolic construction of cold-blooded animals in modern naturalist thought. In Linnaeus’s narrative, these animals are not mere objects of observation, but symbolic operators

that condense desire, fear, alterity, and fascination: the frog as sexual threat and exotified skin; the toad as an emblem of deviant desire; the snake as rumor and metaphor for uncertain knowledge.

Even though Linnaeus did not encounter them on his journey³⁶, their symbolic presence deeply marked the expedition, shaping his perception of the landscape, of bodies, of the beautiful and the monstrous. This essay has sought to show that herpetology is not confined to taxonomy, but also plays out in the ways these creatures inform and transform our gaze. In Linnaeus, that gaze is still a kaleidoscope: scientific and poetic, misogynistic and enchanted, colonial and inquisitive. And at the intersection of these discourses, amphibians and reptiles shine as creatures of the threshold: wet, ambiguous, necessary.

NOTES

- ¹ Linnaeus's ideas on how to assemble a collection of natural history objects were synthesized in Hultman's thesis (1753; 1756), while those related to travel preparation and data collection were presented in Nordblad's (1759; 1760).
- ² The most extreme case is the travel diary of Daniel Rolander's journey to Surinam, first published (in an English translation) only in 2008 (Rolander, 2008).
- ³ This section does not include Linnaeus's travels between 1735 and 1738 to the Netherlands, Germany, Denmark, France, and England, undertaken to further his professional training.
- ⁴ Now divided between the provinces of Västra Götaland and Jönköping.
- ⁵ However, many of the experiences from this journey had already been incorporated into Linnaeus's *Flora Lapponica* (1737), a work that appears to have been read with interest and may have strongly influenced Jean-Jacques Rousseau, who perhaps drew some of his ideas about the noble savage from Linnaeus's portrayals of the Sámi (Thomas Malm, pers. comm.).
- ⁶ *Iter ad fodinas & officinas metallicas Westmanniae & Dalecarlia* (Journey to the mines and metalworks of Västmanland and Dalarna).
- ⁷ Sweden adopted the Gregorian calendar in 1753, skipping from 17 February to 1 March, thereby eliminating the 11-day discrepancy with the Julian calendar (Wahlgren, 2012).
- ⁸ See the letter dated on 26 December 1731, addressed to the Kungliga Vetenskaps-Societeten i Uppsala (L0010; alvin-record: 222484). As noted there, Linnaeus's weaknesses were drawing and mineralogy.
- ⁹ "... Jag vågade äfven då utsätta, med huru ringa summa jag denna resa trodde mig absolvera; nemligen med 600 dlr kmt, hvilket dock vore ej för mycket. Men såsom staten måste indragas så noga, han någonsin kan, kan man klarligen finna, att hvarken jag eller någon annan den samma resan med frukt kan anställa under 450 eller aldra minst 400 dlr kmt...". L0014 en linnaeus.c18.net.
- ¹⁰ "...Jag skall ock söka på det aldra accurataste sätt att vara här vid på penningar sparsam och tror mig kunna komma ut med 600 dir kopparmynt på en sommar med resan bort och tillbaka...". L0010 en linnaeus.c18.net.
- ¹¹ L0018 - The Linnaean correspondence, linnaeus.c18.net; transcribed in Fries (1907).
- ¹² The original map of Linnaeus's journey through northern Scandinavia can be seen at: https://linnean.access.preservica.com/uncategorized/IO_92cab85a-7eb3-48b5-8886-55827efd06da/
- ¹³ Aln, pl. alnar, an old Swedish unit of measurement, approximately equal to 59.4 cm. Equivalent to the English ell.
- ¹⁴ "Lake Enara," as mentioned in historical and literary texts, refers to present-day Lake Inari (Inarijärvi), located in northern Finland near the Norwegian border.
- ¹⁵ Likely alluding to the giant serpents mentioned in Book XXI of Olaus Magnus's *Historia de Gentibus Septentrionalibus*, published during his exile in Rome in 1555.
- ¹⁶ In Latin (*Tunica eorum exterior*) in the original.
- ¹⁷ *Medium epichondri* in the original.
- ¹⁸ *Cart. ensiformen* in the original.
- ¹⁹ The Furies—Tisiphone, Alecto, and Megaera—are the personifications of vengeance in Greco-Roman mythology. Precise attribution is impossible, as they appear in numerous classical authors, though the reference was likely inspired by Ovid or Virgil, two of Linnaeus's favorite poets.
- ²⁰ Styx, the river or lagoon of hatred, separated Earth from the underworld.
- ²¹ It should be mentioned that the Sami are the indigenous people of Sápmi, a region spanning across the northern parts of Norway, Sweden, Finland and Russia. The old word for this people, *Lapps*, is not considered politically correct anymore, but was used at Linnaeus time. The name of the people is usually written Sami, and their region Sápmi. (Thomas Malm, pers. comm.).
- ²² On the exoticization and animalization of indigenous peoples in Enlightenment travel narratives, see Pratt (1992).
- ²³ "...Jag skall ock söka på det aldra accurataste sätt att vara här vid på penningar sparsam och tror mig kunna komma ut med 600 dir kopparmynt på en sommar med resan bort och tillbaka...". L0010 en linnaeus.c18.net.
- ²⁴ Buxbaum (1728).
- ²⁵ *Erica palustris*, drooping, with a purple petiole.
- ²⁶ Andromeda, daughter of Cepheus and Cassiopeia, was chained to a rock as a sacrifice to sea monsters and saved by Perseus (e.g., March, 1998). The poet alluded to is likely Ovid, who recounts the myth in *Metamorphoses* IV, lines 665ff.
- ²⁷ *Capitula florum* in the original.
- ²⁸ *Capitula pallescunt magis magisque, hinc Andromeda dixi, foliis acutis* en el original.
- ²⁹ *Hinc, carneus* in the original. A curious detail arises here, as Ovid (*Heroides* XV:35–36) implies Andromeda was dark-skinned (Ovid, 1914). In the letter, Sappho writes to Phaon: "...*candida si non sum, placuit Cepheia Perseo / Andromede, patriae fusca colore suae*...", which can be translated as "...Though I am not fair, Andromeda of Cepheus—dark with her homeland's hue—pleased Perseus...".
- ³⁰ *Bränvin* in the original; apocope of bränt vin, "burned wine".
- ³¹ *Nuces vomicas* in the original.
- ³² *Cladonia rangiferina*.
- ³³ *Rangifer tarandus*.
- ³⁴ "Lemures" in the original; refers to the Lapland lemming, *Lemmus lemmus*.
- ³⁵ "grodspot" in the original.
- ³⁶ Elmberg (2023) notes that within the area covered by Linnaeus's expedition, there are five amphibian and four reptile species: *Lisotriton vulgaris*, *Triturus cristatus*, *Bufo bufo*, *Rana temporaria*, *Rana arvalis*, *Zootoca vivipara*, *Anguis fragilis*, *Natrix natrix*, and *Vipera berus*.

REFERENCES

- Anderson, I. 1956. *A history of Sweden. Translated from the Swedish by Carolyn Hannay*. Natur och kultur, Stockholm. i-xxvi, 461 pp.
- Blunt, W. 2001. *The compleat naturalist. A life of Linnaeus*. Frances Lincoln Ltd, London. 264 pp.
- Elmberg, J. 2023. Amphibians and Reptiles in North Sweden: Distribution, habitat affinities, and abundance. *Zootaxa* 5301(3):301–335.
- Fries, T. M. 1907. *Bref och Skrifvelser Carl von Linné. Första Afdelningen, Del. I. Skrifvelser till offentliga myndigheter och till Kungl. Vetenskapssocieteten i Upsala utgifna och med upplysande noter försedda*. Aktiebolaget Ijus, Stockholm. iii, 341 pp., [1].
- Gourlie, N. 1953, *The Prince of botanists, Carl Linnaeus*. H. F. & G. Witherby, Ltd, London. Xiii, 291 p., [1].
- Hansen, L. (Chief editor), Eivor Cormack, Ragnar Edberg, Per Sörbom & Viveka Hansen. 2007–2012. *The Linnaeus Apostles: global science & adventure*. 8 volumes in 11 tomes. IK Foundation & Company, London & Whitby.
- Hodacs, H. 2023. Substituting Coffee and Tea in the Eighteenth Century: A Rural and Material History with Global Implications. *Journal of Global History* 18:3, 461–480.
- Hultman, D. 1753. *Instructio musei rerum naturalium*. Laur. Magnus Höjer, Upsaliae. [3], 19 pp., [1].
- Hultman, D. 1756. *Instructio musei rerum naturalium. Amoenitates Academicæ*, 3:446–464.
- Koerner, L. 1999. *Linnaeus: Nature and Nation*. Harvard University Press, Cambridge. 298 pp.
- Kouri, E.I. and J.E. Olsen (eds.). 2016. *The Cambridge History of Scandinavia. Volume II. 1520–1870*. Cambridge University Press, Cambridge. xxxiv, 1152 pp.
- Linnaeus, C. 1732a. *Caroli Linnaei Iter Lapponicum Dei Gratia Institutum 1732. Sumptibus Regie Societatis Literariae et Scientiarum ad Historiam Naturalem Laponiae dilucidandam instructum, quoad lapides, terras, aquas, herbas, arbores, gramina, muscos, quadrupedia, aves, pisces, et insecta imo hominum morbos salutem dietam mores vivendique rationem*. Collection: Linnaean Manuscripts; Reference number: LM/LP/TRV/1/2/1. Linnaean Society, London.
- Linnaeus, C. 1732b. *Original cover to 'Iter Lapponicum'*. Collection: Linnaean Manuscripts; Reference number: LM/LP/TRV/1/2/2. Linnaean Society, London.
- Linnaeus, C. 1745. *Öländska och Gothländska resa på riksens högloflige ständers befallning förrättad år 1741. Med anmärkningar uti oeconomien, natural-historien, antiquiteter &c. med åtskillige figurer*. G. Kiesewetter, Stockholm. [13], 344 pp., [27], [2].
- Linnaeus, C. 1747. *Wästgöta-Resa, på riksens högloflige ständers befallning, förrättad år 1746. Med anmärkningar uti oeconomien, naturkunnigheten, antiquiteter, invånarnes seder och lefnads-sätt*. Lars Salvii, Stockholm. [11], 280 pp., [19], 6 plates.
- Linnaeus, C. 1751. *Skånska resa, på höga öfverhetens befallning förrättad år 1749. Med rön och anmärkningar uti oeconomien, naturalier, antiquiteter, seder, lefnads-sätt. Med tilhörige figurer*. Stockholm. Laurentii Salvii. [8], xiv, 1 map, 434 pp., [34].
- Linnaeus, C. 1811 [1732]. *Lachesis Lapponica, or Tour in Lapland, now first published from the original manuscript journal of the celebrated Linnaeus; by James Edward Smith ... In two volumes*. London. White and Cochrane. Xvi, 366 pp.; 306 pp..
- Linnaeus, C. 1889 [1732]. *Iter Lapponicum Dei gratia institutum 1732*. Pp. 1–201 en E. Åhring (ed.) *Carl von Linnés ungdomsskrifter. Andra Serien*. Stockholm. P. A. Norstedt & Söners.
- Linnaeus, C. 2007. *The Dalarna Journey, together with Journey to the mines and works. Translated and edited by Andrey Casson*. Orebro, Sweden. Gulles Forlag, 320 pp.
- Magnus, O. 1555. *Historia de Gentibus Septentrionalibus, earumque diversis statibus, conditionibus, moribus, ritibus, superstitionibus, disciplinis, exercitiis, regimine, victu, bellis, structuris, instrumentis, ac mineris metallicis, & rebus mirabilibus, necnon vniuersis penè animalibus in Septentrione, degentibus eorumque natura. Opus ut varium, plurimarumque rerum cognitione refertum, atque cum exemplis externis, tum expressis rerum internarum picturis illustratum, ita delectatione iucunditateque plenum, maxima lectoris animum voluptate facile perfundens. (...) Cum indice locupletissimo*. Romae. S.N. [92], 815 pp.
- March, J. 1998. *Cassell's Dictionary of Classical Mythology*. London. Casell & Co. 831 pp.
- Müller-Wille, S. & I., Charmantier. 2012. Natural history and information overload: The case of Linnaeus. *Studies in History and Philosophy of Biological and Biomedical Sciences*, 43 (1):4–15.
- Müller-Wille, S. 2003. Nature as a Marketplace: The Political Economy of Linnaean Botany. *History of Political Economy*, 35 (5):155–173.
- Nordblad, E. A. 1759. *Instructio Peregrinatoris*. Upsaliae. S. n. [3], 15 pp.
- Nordblad, E. A. 1760. *Instructio Peregrinatoris. Amoenitates Academicæ*, 5:298–313.
- Ovid. 1914. *Heroides and Amores. With an English translation by Grant Showerman. The Loeb Classical Library*. London: William Hkinemann. New York: The Macmillan Co. 524 pp.
- Posthous, J. 1563. *Iohan. Posthii Germersheimii Tetrasticha in Ovidii Metam. lib. XV. quibus accesserunt Vergilij Solis figurae elegantiss. & iam primum in lucem editae = Schoene Figuren auss dem fuertrefflichen Poeten Ouidio, allen Malern, Goldtschmidten, und Bildthauern, zu nutz unnd gütem mit fleiss gerissen durch Vergilium Solis, und mit teutschen Reimen kürztlich erkläret, dergleichen vormal im Truck nie; aussgangen durch Johan. Posthium von Germerssheim*. Francofurti. Georgium Coruinum, Sigismundum Feyrabent, & haeredes VVigandi Galli. [16], 178 pp., [14].
- Pratt, M.L. 1992. *Imperial Eyes: Travel Writing and Transculturation*. London. Routledge. [9], xii, 257 pp.
- Roberts, M. 1986. *The Age of Liberty: Sweden 1719–1772*. Cambridge, UK. Cambridge University Press, x, 223 pp.
- Rolander, D. 2008. *Daniel Rolander's Journal*. Sewden, Denmark, Germany, Holland, Suriname, St. Kitts & Nevis. Translated from the Latin by James Dobreff, Claes Dahlman, David Morgan and Joseph Tipton. Pp. 1217–1576, en Lars Hansen (editor-in-chief), *The Linnaeus Apostles - Global Science & Adventure. Volume three, book three*. London & Whitby. The IK Foundation & Co.
- Tournes, I. de. 1557. *La Metamorphose d'Ovide figurée*. Lyon. J. de Tournes. 176 pp.
- Wahlgren, R. 2012. *Carl Linnaeus and the amphibia*. *Bibliotheca Herpetologica*, 9(1–2):5–38.

We suggest the following format for citing this article:

Lavilla, E. O. 2025. Science, Myth, and Otherness: Herpetological Readings of Linnaeus's Lapland Journal. *Bibliotheca Herpetologica* 19(9):116–121.



A Snake Icon in Industrial Advertising: Oldsmobile, the 39th Fighter Squadron and *Life* Magazine in 1943

Christopher J. Bell and Stacie Skwarcan

Jackson School of Geosciences, The University of Texas at Austin, Austin, Texas 78712

cjbell@jsg.utexas.edu, sskwarca@utexas.edu

Snakes, and especially venomous snakes, are well represented as icons on heraldic crests, emblems, patches, and other insignia of the United States armed services (e.g., Stein, 1993, 2007; Hardy and Gingo, 2020; Watkins, 2004, 2006, 2008, 2009, 2013, 2017). Their use may variously represent power, strength, speed, resiliency, tenacity, flexibility, and the danger a unit poses to its enemies. On 18 October 1943 readers of *Life* magazine encountered on (un-numbered) page 9 a striking, full-page, full-color advertisement dedicated to the “*Cobra Cannoneers*” featuring a prominently placed cobra rising above a cloud bank with mouth open and fangs exposed (Figs. 1 and 2). The ad was dedicated to the 39th Fighter Squadron of the U. S. Army Air Corps¹ and simultaneously promoted the industrial productions of the Oldsmobile Division of General Motors in support of the United States war effort in World War II.

The centrally positioned artwork in the ad is a depiction of the official emblem of the 39th Fighter Squadron. The formal description of the squadron emblem reads “On a blue disc bordered in gold a giant cobra poised and ready to strike from behind a cumulus cloud proper” and was approved on 16 April 1941 (Maurer, 1982). Beneath the emblem, and partly obscuring it, on the ad are three Bell P-39 Airacobra aircraft. The largest of the depicted planes shows the squadron emblem painted on the fuselage just below the cockpit. Text on the ad includes “Your snake’s-head insignia is symbolic of your fighting spirit and of the deadly Fire-Power in the noses of your ships.”

The deadly fire-power included a pair of .30-caliber machine guns, a pair of .50-caliber machine guns, and a forward-mounted 37 mm T9 cannon. The cannon was centrally positioned in the nose of the aircraft, protruding and firing through the propeller spinner (Doyle, 2023) and, as the advertisement emphasizes, was effective against aircraft, tanks, trucks, railway locomotives, and small ships. Those cannons were among the many war materials manufactured by Oldsmobile during World War II. But why did an automotive company pay for such a prominent advertisement for a weapon system?



Fig. 1. Cover of the 18 October 1943 issue of *Life* magazine that carried the *Cobra Cannoneers* advertisement.

AUTOMOTIVE COMPANIES AND WAR PRODUCTION

Before the United States entered the war as a combatant nation, the country was, in addition to building up its own capability to wage a modern war, providing military vehicles, aircraft, weapons, and other goods and supplies to the United Kingdom and the Soviet Union. The production demands were extraordinary, obviously destined to expand, and well beyond the limits of what the government alone could meet (Herman,

-to the COBRA CANNONEERS!

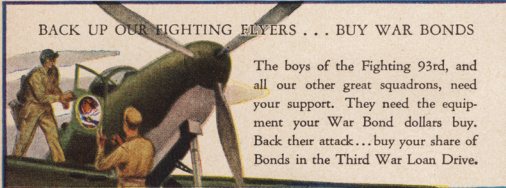
OFFICIAL INSIGNIA OF
THE 93RD FIGHTER SQUADRON,
U. S. ARMY AIR CORPS

The sides of their Airacobra fighter planes
are decorated with the asp or venomous
cobra, historic symbol of quick death to
whomever it strikes.



A TOAST TO THE STRAIGHT-SHOOTING, FAST-FLYING MEN OF THE 93RD FIGHTER SQUADRON . . . You're one of the many famous squadrons who fight with "flying cannon." Your snake's-head insignia is symbolic of your fighting spirit and of the deadly Fire-Power in the noses of your ships. You can blast an enemy plane with a single round from your fast-firing cannon. You can stop a tank, destroy a truck, wreck a railway locomotive, or even sink a small ship . . . all with the power of your cannon. More Fire-Power for you!

BACK UP OUR FIGHTING FLYERS . . . BUY WAR BONDS



The boys of the Fighting 93rd, and all our other great squadrons, need your support. They need the equipment your War Bond dollars buy. Back their attack . . . buy your share of Bonds in the Third War Loan Drive.

The "Fangs of the Cobra," the hard-hitting aerial cannon in the noses of Airacobra fighter planes, are a wartime product of Oldsmobile. These powerful automatics shoot either high-explosive or armor-piercing shell . . . at rapid-fire rate . . . and with true "sharpshooter" accuracy. They're precision-built weapons, which Oldsmobile produces in volume. Olds-

mobile also builds two other types of automatic aerial cannon, plus shell and high-velocity cannon for tanks and tank destroyers, plus large caliber shell for the Artillery and the Navy. Keeping 'Em Firing is our wartime job at Oldsmobile . . .

FIRE-POWER
is Our Business!

OLDSMOBILE DIVISION OF GENERAL MOTORS
KEEP 'EM FIRING

Fig. 2. The Oldsmobile advertisement honoring the 39th Fighter Squadron of the U. S. Army Air Corps. In three places the ad incorrectly identifies the squadron as the 93rd Fighter Squadron.

2013). In May of 1940, President Franklin Roosevelt expanded the process of engaging private industry in the development of weapons and equipment by appointing the Council of National Defense Advisory Commission (NDAC). The NDAC included leaders from American businesses and labor (General Motors, U.S. Steel, Amalgamated Clothing Workers, Chicago Burlington Railroad) as well as representatives from the Federal Reserve Board and Securities and Exchange Commission, and an advisor on consumer issues. The NDAC had no legal authority to compel business leaders to cooperate with the war effort but instead drew upon personal connections and shared experiences to convince business leaders to participate. By January 1941 the need for a decision-making body with authority to issue directives became apparent, and the NDAC was replaced by the Office of Production Management, and a year later by the War Production Board, each with increased authority to engage private business in war production, or to re-direct critical materials to higher-priority defense industries (Kennett, 1985; Herman, 2013). Both latter agencies applied pressure to the automotive industry in the United States, first to limit civilian auto production and later to shut it down completely in favor of military production.

On 1 January 1942 new car sales were frozen by the U.S. government; approximately half a million vehicles left on showroom floors across the country were re-purposed for use by the War Department and other essential government agencies (Kennett, 1985). By the middle of February 1942, the last civilian automobiles rolled off assembly lines, and the automotive industry was fully engaged in re-tooling and converting production facilities for wartime production (Clive, 1979; Kennett, 1985; Baime, 2015). By June, not only had production of passenger cars and commercial trucks been halted, but also production of items such as metal office furniture, radios, phonographs, refrigerators, vacuum cleaners, washing machines, and sewing machines (Kennett, 1985). Each company and facility made decisions about contracts to accept from the government for production of materials to support the war effort (Herman, 2013).

General Motors Corporation proved to be a powerhouse of wartime production. It began delivering military weapons and equipment in 1940, and by the end of the war in summer of 1945 all of its over 100 manufacturing plants in the United States were converted for defense production (GM Defense, 2025). In total, General Motors divisions handled government contracts in excess of \$13,797,541,000 (Jackson, 2025a; equivalent to 2025 value of \$247,626,001,387). Oldsmobile was one of five car divisions of General Motors Corporation (which also operated over 20 other component divisions). They operated out of four facilities, located in Detroit, Michigan; Janesville, Wisconsin; Kansas City, Missouri; and Lansing, Michigan. Oldsmobile's total major wartime contracts were \$385,327,000 (Jackson, 2025a; equivalent to 2025 value of \$6,915,506,483). Their wartime production output included aircraft parts, truck axles, and other miscellaneous materials but was dedicated primarily to cannons and muni-

tions. The four combined facilities produced over 45 *million* shells and projectiles during the war. Between mid-July 1942 and mid-June 1943, the Lansing facility produced 2,779 of the T9 aircraft cannons celebrated in the *Life* magazine advertisement (Jackson, 2025b).

A NEED FOR ADVERTISING

'Institutional advertising' in the United States was common during WWII and was primarily concerned with keeping the name, image, and reputation of a *company*, rather than its products or services, in the mind of civilians during times when that company was not actually producing any goods for civilian consumption (Jones, 2009). The *Cobra Cannoneers* ad is an excellent example of this, emphasizing the patriotic effort of the company to support the war effort, and encouraging the purchase of war bonds, while keeping the Oldsmobile name in front of the American people in a leading magazine of the day. Ads such as these outnumbered all other kinds of ads dealing with industrial support for the war (Jones, 2009).

39TH SQUADRON

The choice of the 39th Fighter Squadron emblem (Figs. 2 and 3) highlighted their use of the P-39 Airacobra plane with the T9 cannon, and simultaneously provided the powerful image of the cobra as an eye-catching allure to draw readers to the ad. The 39th was originally constituted as the 39th Pursuit Squadron in December 1939. They were activated in February of 1940, then redesignated the 39th Fighter Squadron in May 1942, a designation they retained until the end of WWII (Maurer, 1982). They flew in active service in Australia and New Guinea from 1942 through 1944, then were in service in the Pacific theatre, including in the Philippines and Okinawa. The squadron was stationed in Japan after the end of the war. They later served in the Korean war and were deactivated in December 1957 (Maurer, 1982; Stanaway, 1982). The squadron was reactivated as the 39th Tactical Reconnaissance Training Squadron in 1969 (Fig. 4). Apart from short service as a test squadron (Fig. 5) they remained a flying training unit since 1990 and are currently stationed at Randolph Air Force Base in Texas.

Throughout that history the cobra emblem was retained but it was modified in several ways. The early design of the emblem was shown in the Oldsmobile ad (Fig. 2) and is depicted in Fig. 3. In that design the snake's mouth is open, a red forked tongue extending between two exposed fangs (rendered in differing lengths in those two examples). In later designs (Figs. 4, 5, and 6) either two (Fig. 5) or four (Figs. 4 and 6) drops of venom are dripping from the fangs. We were unable to determine when the venom was added to the emblem, nor for what purpose². A special 'morale' patch was issued during the COVID shutdown that featured a festive, holiday version of the emblem in which the cobra dons a Santa Claus hat and drips venom toward Santa's sleigh and



Fig. 3. An early design of the 39th Fighter Squadron jacket-patch. Note the relatively short fangs and the absence of venom drops.



Fig. 4. A colorful version of the emblem of the 39th Flying Training Squadron with four venom drops beneath elongated fangs.



Fig. 5. A shoulder patch from the time when the 39th was designated as a Test Squadron. Here, the cobra has elongated fangs with two drops of descending venom.



Fig. 6. A 'morale' shoulder-patch of the 39th Flying Training Squadron from December 2020 with four venom drops descending toward Santa Claus in his sleigh.

reindeer as they pass in front of the cloud bank below the cobra's head (Fig. 6).

We found several historical photographs that depict the emblem as it was applied on aircraft, or on patches worn by aviators. A reversed emblem (i.e., the cobra is facing to the left as viewed) on the left side of a Bell P-39 Airacobra was published by Stanaway (1982, p. 4); he also provided a pho-

tograph of four officers in 1941 wearing large jacket-patches with the emblem (p. 5; it is not possible to tell whether venom drops were present on those patches). A color photograph of a squadron of P-39 aircraft at Selfridge Field (Michigan) in 1941 also clearly shows the reversed emblem (cobra facing to the left as viewed) on the left side of the first three aircraft in the foreground (Doyle, 2023, p. 51). A photo posted on-

line (Clark, 2011) shows the emblem on the right side of the plane, oriented as it is on the patches we illustrate. When it was stenciled or painted on an aircraft, the emblem appears always to have been oriented so that the cobra faced toward the front of the plane. The sole exception to this that we found was on the artist's rendition of the emblem on the three planes in flight in the *Life* magazine advertisement (Fig. 2).

It is clear from our preliminary exploration of military heraldry that snakes of various kinds are somewhat common in emblems and unit insignia of the armed services of the United States of America. The Oldsmobile advertisement in 1943 is special because it brought this example of reptilian iconography to the attention of a broad audience in the readership of *Life* magazine, one of the prominent magazines of the time in the United States. It serves also to remind us today of the contributions made to the success of United States efforts in WWII by the automotive industry, and the methods they pursued to maintain a connection to the citizens they were temporarily not able to serve through their traditional commercial enterprises.

ACKNOWLEDGEMENTS

We thank Breck Bartholomew for encouraging our work on the intersection between World War II and herpetology. Comments on an earlier draft of this paper were provided by Jim Mead, Mitchell Riegler, and Geraldine Swartz; their efforts on our behalf are greatly appreciated. We gratefully acknowledge Ralph Tramontano's continuing work on production and layout of the papers appearing in this journal, including our own. He also pointed out the inconsistency in the orientation of the emblem on the flying airplanes depicted in the *Life* magazine advertisement (Fig. 2).

NOTES

1. In three places, the ad incorrectly printed the squadron designation as the 93rd Fighter Squadron.
2. We checked two editions of the official military record of the United States Air Force (Maurer, 1982, 1992) and in both the emblem of the 39th Fighter Squadron is depicted with four drops of venom descending from the open mouth of the cobra. The Institute of Heraldry website (<https://tioh.army.mil/Catalog/Heraldry.aspx?HeraldryId=10913&CategoryId=6225&grp=1&menu=Uniformed%20Services>) describes the emblem of the 39th Flying Training Squadron as "On a disc Azure, issuant from base through clouds Proper, a giant cobra poised to strike Braun, breast Or, markings Sable, detailed of the second, langued Gules, eyed, armed and dripping venom Argent, all within a narrow border Blue. Attached below the disk, an {sic} Yellow scroll edged with a narrow Ultramarine Blue border and inscribed "39TH FLYING TRAINING SQ" in Blue letters". That is a description of the emblem we illustrate in our Fig. 4. The cobra is reported there to represent "the tenacity and veracity of the unit's highly qualified instructor pilots. Like cobras, the instructors are highly skilled and respected warriors of their breed" (accessed 25 March 2025).

REFERENCES

- Baime, A. J. 2015. *The Arsenal of Democracy. FDR, Detroit, and an Epic Quest to Arm an America at War*. Mariner Books, New York, New York. xx + 364 pp.
- Clark, Bekah. 2011. 39th FTS celebrates 70 years. *Joint Base San Antonio News*, December 15, 2011.
- Clive, Alan. 1979. *State of War: Michigan in World War II*. The University of Michigan Press, Ann Arbor, Michigan. xiii + [1] + 301 pp.
- Doyle, David. 2023. *Legends of Warfare. Aviation. P-39 Airacobra Bell Fighter in WWII*. Schiffer Publishing, Ltd., Atglen, Pennsylvania. 144 pp.
- GM Defense. 2025. A Legacy of Service. (Accessed 15 February 2025).
- Hardy, Jason, and Aric Gingo. 2020. *US Army Special Forces Insignia of the Vietnam War: The Definitive Collectors Guide. The MAC V SOG Recon Teams*. Hardy Publications, Spencer, North Carolina. [1] + 418 + [2] pp.
- Herman, Arthur. 2013. *Freedom's Forge. How American Business Produced Victory in World War II*. Random House Trade Paperbacks, New York, New York. xiv + 413 pp.
- Jackson, David D. 2025a. The American Automobile Industry in World War Two. An American Auto Industry Heritage Tribute. General Motors Corporation in World War Two. (Accessed 15 February 2025).
- Jackson, David D. 2025b. The American Automobile Industry in World War Two. An American Auto Industry Heritage Tribute. The Oldsmobile Division of General Motors in World War Two. (Accessed 15 February 2025).
- Jones, John Bush. 2009. *All-Out for Victory. Magazine Advertising and the World War II Home Front*. Brandeis University Press, Waltham, Massachusetts. xi + [3] + 314 pp.
- Kennett, Lee. 1985. *For the Duration... The United States Goes to War. Pearl Harbor – 1942*. Charles Scribner's Sons, New York, New York. ix + [1] + 243 pp.
- Maurer, Maurer, ed. 1982. *Combat Squadrons of the Air Force. World War II*. Albert F. Simpson Historical Research Center and Office of Air Force History, Headquarters, USAF, Washington, D.C. xi + [1] + 841 pp.
- Maurer, Maurer, ed. 1992. *World War II Combat Squadrons of the United States Air Force. The Official Military Record of Every Active Squadron*. Smithmark Publishers, Inc., New York, New York. ix + [1] + 841 pp.
- Stanaway, John. 1982. *Cobra in the Clouds. Combat History of the 39th Fighter Squadron 1940–1980*. Historical Aviation Album Publication, Temple City, California. 47 pp.
- Stein, Barry Jason. 1993. *U.S. Army Heraldic Crests. A Complete Illustrated History of Authorized Distinctive Unit Insignia*. University of South Carolina Press, Columbia, South Carolina. xiii + [1] + 461 pp., Plates 1-129.
- Stein, Barry Jason. 2007. *U.S. Army Patches, Flashes and Ovals*. Insignia Ventures, n.l. xxvi + 433 + 40 pp.
- Watkins, Robert A. 2004. *Battle Colors. Insignia and Aircraft Markings of the Eighth Air Force in World War II. Volume I. (VIII) Bomber Command*. Schiffer Publishing Ltd., Atglen, Pennsylvania. 127 pp.
- Watkins, Robert A. 2006. *Battle Colors. Insignia and Aircraft Markings of the Eighth Air Force in World War II. Volume II. (VIII) Fighter Command*. Schiffer Publishing Ltd., Atglen, Pennsylvania. 143 + [1] pp.

- Watkins, Robert A. 2008. *Battle Colors. Insignia and Tactical Markings of the Ninth Air Force in World War II. Volume III. The Orphan Air Force of the ETO*. Schiffer Publishing Ltd., Atglen, Pennsylvania. 167 pp.
- Watkins, Robert A. 2009. *Battle Colors. Insignia and Aircraft Markings of the U.S. Army Air Force in World War II. Volume IV. European-African-Middle Eastern Theater of Operations*. Schiffer Publishing Ltd., Atglen, Pennsylvania. 141 pp.
- Watkins, Robert A. 2013. *Battle Colors. Insignia and Aircraft Markings of the U.S. Army Air Force in World War II. Volume V. Pacific Theater of Operations*. Schiffer Publishing Ltd., Atglen, Pennsylvania. 151 + [1] pp.

Watkins, Robert A. 2017. *Battle Colors. Insignia and Aircraft Markings of the U.S. Army Air Force in World War II. Volume VI. China-Burma-India & the Western Pacific*. Schiffer Publishing Ltd., Atglen, Pennsylvania. 160 pp.

We suggest the following format for citing this article:

Bell, C. J., and S. Skwarcan. 2025. A Snake Icon in Industrial Advertising: Oldsmobile, the 39th Fighter Squadron and *Life* Magazine in 1943. *Bibliotheca Herpetologica* 19(10):122–127.



A Note on Carolina Frog Farms, Columbus County, North Carolina, USA

C. Kenneth Dodd, Jr.

5222 N.W. 56th Court, Gainesville, Florida 32653, USA. terrapene600@gmail.com

In the mid-1950s, Douglas Reynolds of Baltimore, Maryland, had the idea of developing a frog farm industry at his family's farm in Old Dock, Columbus County, North Carolina. Reynolds was in the U.S. Navy in World War II where he was an electrician, an occupation he followed in Baltimore where he worked throughout his career for the Baltimore News American. Reynolds was seriously injured in an electrical accident that hospitalized him for nearly a year. While recovering, he became friends with a physician named Leonard McGlothlin who convinced him to look into frog farming as a way to supply American demands for frog's legs. McGlothlin traveled with Reynolds to the Reynolds' family farm and after seeing the farm, suggested that frog farming might be suitable in eastern North Carolina. McGlothlin also provided Reynolds with a book on frog farming (Harrison, 1956a, b). To Reynolds, it seemed like a way to supplement the farm income as the tobacco acreage allotment had recently decreased thus adversely affecting his family's income (Harrison, 1956a, b).

After several years, Reynolds was able to dig his first one-acre pond. He imported his first bullfrogs from New Orleans (using Albert Broel's "Newfoundland" bullfrogs). The bill ran \$154.12 for five pairs of breeders, plus \$160 for 1100 tadpoles (Harrison, 1956a, b). Combined with bullfrogs from Arkansas (possibly from the Brashears family; see Dodd and Jennings, 2021), he claimed to have developed a new breed of bullfrog, the "Giant Food Frog." His father, Henry Earl Reynolds, and two assistants ran the farm, named Carolina Frog Farms (CFF), which he supervised by flying back and forth from Baltimore to North Carolina in his private plane. The CFF was located near the junction of NC 130 and Hallsboro-Old Dock Road in Old Dock, which is southwest of Whitesville, North Carolina¹. An unattributed newspaper article (see Note 4) mentions three ponds, but five were eventually constructed (Osborne, 1957). Reynolds mentions that frogs' legs were averaging ca. \$1.65/pound with a production cost of only \$0.50 (in Stump, 1957). He further stated in the article that the cost of getting started would be "not over \$500."

I can find no information on the fate of the Carolina Frog Farms, how long it operated, or how successful or unsuccessful it was². Harrison (1956b) stated that he was

told it would be 12 months before "it was worth the effort." According to Anonymous (1957), H.E. Reynolds was able to sell bullfrogs to others who wanted to start a farm. Osborne (1957) mentioned sales of \$2,008 worth of breeding stock in spring 1957 (with orders coming in daily) and \$30 worth of tadpoles (at \$0.10 each) in one day that year. Douglas Reynolds never returned to live in Old Dock, and his father died in December 1960 perhaps ending the younger Douglas' incentive to continue the enterprise.

THE BOOK

In connection with the establishment of Carolina Frog Farms, Reynolds collaborated with L. Piersant in publishing a book on frog farming. Copyrighted in 1957 by Leonard S. McGlothlin, Piersant, and Reynolds³, *The Breeding of Giant Food Frogs* was a well-produced publication of 90 pages plus three pages of newspaper articles about the farm (Fig. 1). It measures 14.5 x 22 cm and is printed on high quality paper, very similar to the journal *American Midland Naturalist* from that era. There is no date, publisher, or place of publication listed, but there is a copyright notice dated 1957; since the authors all resided in Baltimore, it seems reasonable to assume the place of publication was that city. The authors' employment by the Baltimore Sun newspaper suggests that they were able to secure a publisher perhaps linked with that newspaper.

The book begins with a short introduction and a section on general facts about frogs. The main part of the book consists of six chapters providing information on the establishment of a frog farm: (1) Business of breeding frogs, (2) About the frog, (3) Preparations for a successful farm, (4) The growth and acquisition of feed stock, (5) Plant life, and (6) Conclusion. The text is detailed in nature and suggests Reynolds was familiar with frog farming operations in Louisiana and California. It covers everything from acquiring stock, frog diseases, handling unwanted visitors (both predators and human), and establishing vegetation, to packaging and distribution to markets. The text is supplemented with numerous line drawings and black and white photographs (Figs. 2–4). Some of the illustrations are credited to Piersant, and all the photographs were taken at

CFF, often featuring Reynolds or members of his family or community. There are no references cited and specific details of CFF's operations (i.e., production, selling prices) are not provided.

The Breeding of Giant Food Frogs was sold by Reynolds for \$5.00 (Anonymous, 1957), and in 1958 the book was advertised in the classifieds in *Florida Grower*, *The Progressive Farmer*, and *Popular Mechanics* where it could be purchased directly from him at a Whitesville address. In terms of frog-farming publications, *The Breeding of Giant Food Frogs* is certainly one of the most professionally produced books. Today, however, both the book and Carolina Frog Farms are little-known and nearly lost to memory. The only apparent historic evidence of the farm's existence is this small book on how to construct a frog farm and raise bullfrogs and some period newspaper articles.

NOTES

1. I searched for a possible location of the five ponds mentioned in the newspaper articles on the U.S. Geological Survey's historical topographic maps web page for the location (<https://ngmdb.usgs.gov/topoview/viewer/#16/34.1973/-78.6056>). There were no maps available at a scale useful for the period 1953 – 1990. Although speculative, a series of squarish ponds immediately north and east of the junction of NC highway 130 and Hallsboro Road S. (34.1948 N; 78.6070 W, 13 m elevation) might be the location of the frog ponds.
2. There is no reference to this farm in the local Columbus County, North Carolina, newspaper, *The News Reporter*, from 1924 to 1981 [pdf list of stories available from the Columbus County library; <https://ccplnc.weebly.com/local-history--genealogy.html>]. No copies are listed in WorldCat, nor is there a copy in the Columbus County library. The North Carolina Agricultural Extension Office for Columbus County did not respond to a request for information, although an unattributed news story (see below) mentions that the extension service at one time was interested in learning more about the farm. The library at North Carolina State University, the state's Land Grant university, does not have a copy.
3. The authors of the book are L. (Louis Paul) Piersant (5 June 1920 – 13 September 1994) and D. (Douglas C.) Reynolds (18 August 1926 – 30 May 2009). Piersant was a production manager and Reynolds was an electrician, both at the Baltimore News American newspaper in Baltimore, Maryland. The book is dedicated to Leonard Shaw McGlothlin (ca. 21 April 1917 – 8 March 1968) and he appears as the lead name on the copyright notice. McGlothlin was a licensed physical therapist physician in

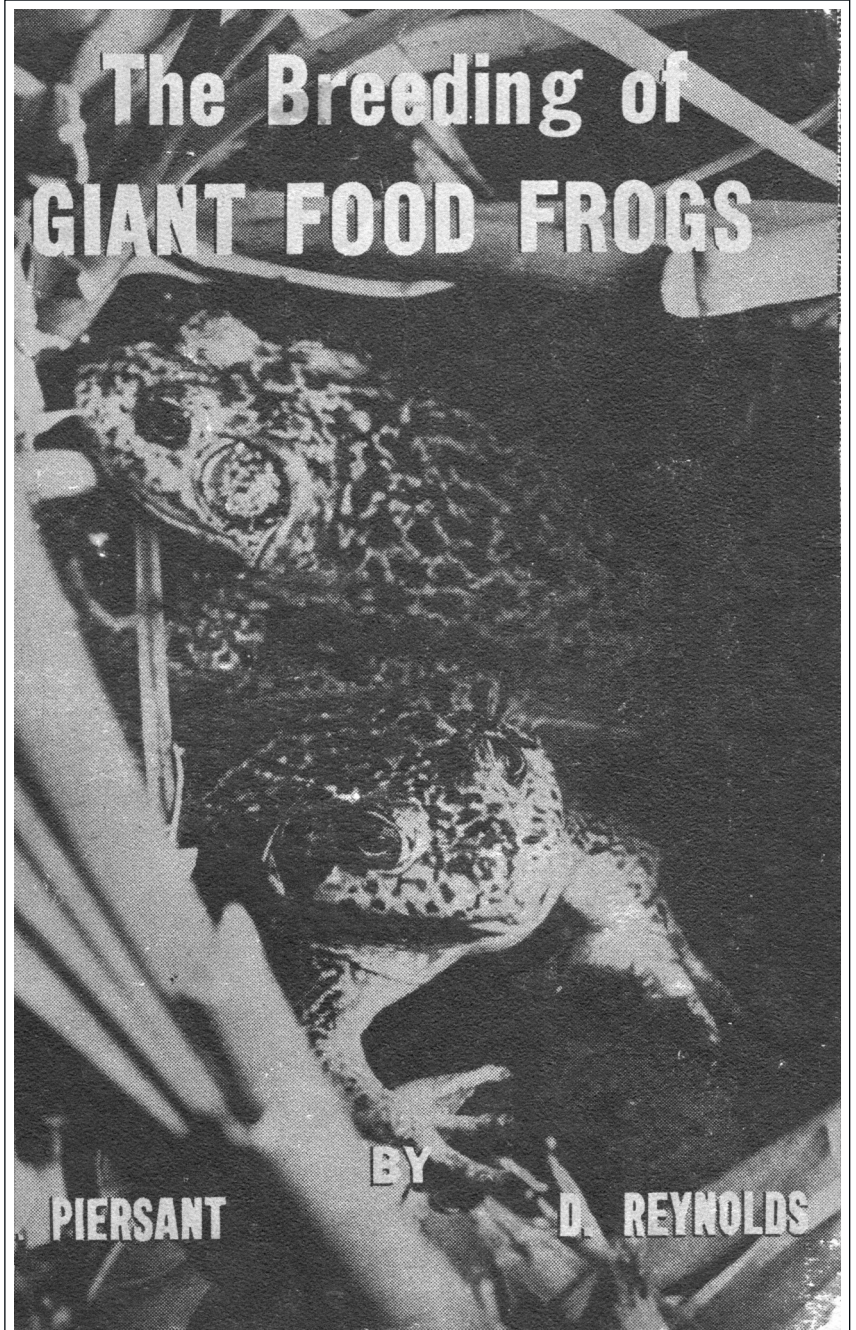


Fig. 1. *The Breeding of Giant Food Frogs*. Cover.

4. Baltimore and treated Douglas Reynolds after his accident.
4. There are four newspaper clippings published in the book. The first at the beginning of the book, by Shep Shepard, appeared in the *Fishing Annual of Sports Afield* magazine in 1956 and promotes frogging, but has nothing specific to do with Carolina Frog Farms. A second clipping discusses Carolina Frog Farms ("Five Acres of – Bullfrogs") and was written by William Stump, a reporter for the Baltimore Sun newspaper (Stump, 1957). The third partial article (in the "Waters and Woods" feature) was by Bill Burton that appeared in *The [Baltimore] Evening Sun* on 22 March 1957, but it does not contain more than a passing reference to Douglas Reynolds. The fourth article ("Frogs Called Good Income Idea")



D. Reynolds At The Entrance of Carolina Frog Farms

Fig. 2. Douglas Reynolds at the entrance to Carolina Frog Farms. From *The Breeding of Giant Food Frogs* (p. 85).



Unfenced Feed Stock Pond

Fig. 3. A stock pond at Carolina Frog Farms. From *The Breeding of Giant Food Frogs* (p.33).

is unattributed but mentions the farm was “right here in Columbus County,” which suggests a local origin [but see Note 2]. The articles on the CFF likely appeared in 1957. What is known of the CFF comes from the unattributed article and the newspaper articles cited below.

ACKNOWLEDGEMENTS

I thank Margaret Ray of the Columbus County library for looking for details of Carolina Frog Farms in the library’s records.

REFERENCES

- Anonymous. 1957. Frog farm good business, Whiteville man profiting. Rocky Mount [North Carolina] Telegram, 11 November 1957, p. 13.
- Dodd, C. Kenneth, Jr., and Mark R. Jennings. 2021. How to raise a bullfrog — The literature on frog farming in North America. *Bibliotheca Herpetologica* 15(8): 77–100.
- Harrison, Al. 1956a. Old Dock farmer starts frog farm. Tabor City [North Carolina] Tribune, 18 April 1956, p. 1.
- Harrison, Al. 1956b. Frog farm started in Columbus. The News and Observer [Raleigh, North Carolina], 7 May 1956, p. 17.
- Osborne, Clyde. 1957. Frog farming is easy, fun and lucrative. The Charlotte Observer [Charlotte, North Carolina], 21 October 1957, p. 23.
- Piersant, Louis, and Douglas Reynolds. 1957. *The Breeding of Giant Food Frogs*. Privately published, Baltimore, Maryland. xviii + 90 pp. [+ the newspaper clippings].
- Stump, William. 1957. Bullfrogs. The Baltimore [Maryland] Sun, 14 April 1957, p. 260.



Peggy Worrell Shows Products of a Well Planted Pond

Fig. 4. Edna (Peggy) Worrell holding American Bullfrog at Carolina Frog Farms. Peggy Worrell was Douglas Reynolds' sister. From *The Breeding of Giant Food Frogs* (p. 77).

We suggest the following format for citing this article:

Dodd, C. K. Jr. 2025. A Note on Carolina Frog Farms, Columbus County, North Carolina, USA. *Bibliotheca Herpetologica* 19(11):128–131.

Carl Hagenbeck's Trade in Reptiles, His Historical Reptile Exhibitions, and His Herpetological Legacy*

André Koch

Biohistoricum – Research Archive for the History of Biology at the Museum Koenig Bonn, Germany.
Leibniz Institute for the Analysis of Biodiversity Change (LIB), Adenauerallee 127, 53113 D-Bonn, Germany.
a.koch@leibniz-lib.de

“The main suppliers of exotic reptiles are Umlauff in Hamburg (Spielbudenplatz 8) and Carl Hagenbeck from there. Almost all imported reptiles can be obtained from these two important continental companies.”

Translated quotation from Johann von Fischer (1884: 101): *Das Terrarium, seine Bepflanzung und Bevölkerung — Ein Handbuch für Terrarienbesitzer und Tierhändler* [The terrarium, its planting and inhabitants — a handbook for terrarium owners and animal dealers].

Abstract. The name of Carl Hagenbeck is commonly linked to the Hamburg Zoo, a circus, the large-scale animal trade, and the controversial historical ethnological shows, so-called human zoos or Völkerschauen. All these enterprises were involved with animals, whether they were wild or domestic. Although reptiles, and particularly amphibians, appear to have played no major role in Carl Hagenbeck's international endeavors, this paper aims to explore his historical impact on herpetologists, reptile keepers, and the public, particularly in German-speaking countries. I will demonstrate that historical studies of herpetology and herpetoculture have neglected Carl Hagenbeck's firm and will reveal the significant role that large reptile species, such as crocodiles, alligators, and giant snakes played in his various endeavors, but especially in his reptile exhibitions, which have received little attention from historians and herpetologists to date. Therefore, Carl Hagenbeck's influence on scientists, animal keepers, and the general public deserves greater recognition.

Key words: Animal trade, Vienna Prater, zoological gardens, Tierpark Hagenbeck, giant reptiles, natural history museums

* This article is an extended and translated extract of the following publication: Koch, A. (2024): Der Einfluss der Hamburger Handelshäuser Hagenbeck und Umlauff auf die Herpetologie und Terrarienkunde im deutschsprachigen Raum. Pp. 701–741 in: W. Bischoff (Ed.). *Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum – III. Mertensiella* 33 (Supplement to *Salamandra*). Deutsche Gesellschaft für Herpetologie und Terrarienkunde e.V. (DGHT), Salzhemmendorf, Germany.

CARL HAGENBECK — A HANSEATIC SUCCESS STORY

The traditional Hanseatic family business of Carl Gottfried Wilhelm Heinrich Hagenbeck (1844–1913; Fig. 1) bears a well-known name, though it is rarely associated with herpetology or herpetoculture.¹ Instead, the name Hagenbeck is more commonly linked to the Hamburg Zoo,² a circus, the large-scale animal trade, and controversial historical ethnological shows, so-called human zoos or Völkerschauen (Dittrich and Rieke-Müller 1998, Thode-Arora 1989). As Carl Hagenbeck is generally well known, only a short summary of his biography will be provided here.³

Carl Hagenbeck came from a family of fishmongers in the Hanseatic city of Hamburg. In 1848, his father acquired six seals and presented them on Spielbudenplatz, which today is close to the infamous Reeperbahn in the St. Pauli district.

In the mid-19th century, Spielbudenplatz was a vibrant place just outside the city gates. It was originally characterized by simple wooden huts (Spielbuden) for artists and jugglers. The family's little menagerie gradually developed into a thriving animal trade, in which Carl worked from an early age. In 1866, at the age of 21, he took over his father's business and turned it into one of the leading animal trading companies. In 1874, he opened 'Carl Hagenbeck's Thierpark' [animal park] at Neuer Pferdemarkt 13, which he advertised in the popular bird lover's magazine "Die gefiederte Welt" (The feathered world) with elephants, giraffes, lions, and—most notably—"40 giant snakes up to 20 feet long" (Fig. 2). The following year, Hagenbeck expanded into the ethnological exhibition business, organizing his first show featuring a small group of Scandinavian Sámi. In doing so, he tapped into the general public's fascination and curiosity for all things exotic and foreign. Due to its success, various other



Fig. 1. Carl Hagenbeck (1844–1913), the famous Hamburg animal dealer, ethnological show organizer, and zoo founder.

ethnological groups were assembled in subsequent years and presented alongside their customs, traditions, and farm animals throughout Europe. Hagenbeck also opened his first circus in 1887.

Due to a lack of space, the company was relocated to another site and “the world’s first zoo without bars and fences” was opened in the Prussian town of Stellingen—then still outside the city area of Hamburg—in 1907 (Hagenbeck 1909). From the outset, the zoo also had a reptile house in which giant snakes and crocodiles were exhibited. At its opening, 32 alligators and eight pythons from Borneo were housed there (Dittrich and Rieke-Müller 1998: 204f). One year later, Hagenbeck (1909) displayed 36 tortoises, 12 monitor lizards, iguanas, and other lizards, 11 crocodiles and alligators, as well as 68 snakes. From summer 1911, additional amphibians and reptiles were exhibited in the new insect house under the management of Friedrich “Fritz” Dörries (1822–1917).⁴ This attraction was constantly advertised. For example, Ludwig Zukowsky (1888–1965), Hagenbeck’s scientific assistant at the zoo, reported that chameleons were exhibited alongside stick insects to demonstrate mimicry (Zukowsky 1914: 231). In another instance, the Amazonian mata mata (*Chelus fimbriata*) was mentioned as a herpetological rarity and depicted in a photograph.

After Carl Hagenbeck’s death in 1913, his sons and grandsons continued the family business, successfully guiding it through the disasters of the 20th century (Hagenbeck 1955), even though the animal trade was gradually phased out after World War II. To celebrate the zoo’s 100th anniversary in 2007, the new “Tropen-Aquarium” (tropical aquarium) was opened to the public, replacing the “Troparium”, which had

212

Die gefiederte Welt. Zeitschrift für Vogelliebhaber, -Züchter und -Händler.

Nr. 26

C. Hagenbeck's Handelsmenagerie, das größte derartige Geschäft der Welt,

[385]

**Hamburg,
St. Pauli, Neuer Pferdemarkt Nr. 13.**

Einem hochgeehrten hiesigen und fremden Publicum die ergebene Anzeige, daß, weil die bisher Spielbudenplatz Nr. 19, benutzten Räumlichkeiten sich als unzureichend erwiesen, seit dem 1. Mai cr. meine Handelsmenagerie nach dem **Neuen Pferdemarkt Nr. 13** verlegte, während das Vogelgeschäft nach wie vor in dem alten Etablissement, Spielbudenplatz Nr. 19 verbleibt.

In den fast sämtlich neu aufgeführten freundlichen und geräumigen Gebäuden und Volieren, wie sie die ca. 80,000 Quadratfuß großen Parkanlagen des heutigen Etablissements zeigen, sind die Thiere ähnlich den zoologischen Gärten untergebracht und befinden sich außer **15 Löwen** augenblicklich dort:

Königstiger, Panther, Leoparden, Bären
und andere Raubthiere,

**Elephanten, Rhinoceros, Giraffen,
Antilopen, amerikan. Riesenbische, Büffel,**
eine Anzahl

afrikanischer und amerikanischer Strauße, verschiedene Kraniche,

40 Riesenschlangen

bis zu 20 Fuß Länge

vorrätig.

Ende dieses Monats trifft auch der

dritte diesjährige Thiertransport

(diese drei Transporte bildeten ursprünglich einen einzigen, der unter andern Thieren **27 Giraffen** zählte, doch war es nicht möglich, diese colossale Anzahl wilder Thiere mit-sammen durch die Wüste zu bringen und eine Theilung dringend geboten) hier ein, welcher außer **16 großen Giraffen, Antilopen, Elephanten, Löwen, Leoparden, Hyänen** und viele andere seltene Thiere und Vögel auf hier bringt.

Bei günstiger Witterung werden stets **Giraffen, Elephanten, Rhinoceros, Strauße, Kraniche** etc. in dem eigens dazu umzäunten Raume ins Freie gelassen.

Exklusiv-Verlag: Verlagsgesellschaft (Hofen & Hofmann) in Berlin. — Druck: W. Gieseler, Berlin, Wilhelmstraße 32.

Fig. 2. Advertisement from the popular magazine “Die gefiederte Welt” (the feathered world) announcing the relocation of “Carl Hagenbeck’s Thierpark” (animal park) on 1 May 1874 to Neuer Pferdemarkt No. 13 in Hamburg St. Pauli. Large giant snakes were particularly emphasized (“40 giant snakes up to 20 feet long”).

been open since 1960 exhibiting giant reptiles such as alligators, crocodiles, Galapagos giant tortoises, and huge water monitor lizards next to many other tropical species (Fig. 3). In keeping with tradition, the new building also features various amphibian and reptile species, including a large enclosure for Nile crocodiles at the center.

REPTILES IN CARL HAGENBECK'S ANIMAL TRADING COMPANY

The earliest information available to me comes from Meyer (1873), who described a walk through Hagenbeck’s trade menagerie in Hamburg⁵ (“Ein Gang durch die C. Hagenbeck’sche Handels-Menagerie”) on 8 October the previous year. Although reptiles are only mentioned in passing during the tour—namely, that “various large, closed boxes containing large snakes [...] were set up in the inner room”—Hagenbeck provided the reporter with two directories from



Fig. 3. The so-called “Troparium” at Hagenbeck Zoo was opened in 1960 and exhibited giant reptiles such as alligators, crocodiles, Galapagos giant tortoises, and huge water monitor lizards, as well as many other tropical species. In 2007, on the occasion of the zoo’s 100th anniversary, it was replaced by the new “Tropen-Aquarium” (tropical aquarium), which also houses many amphibians and reptiles.

which more detailed information about the conditions at the time can be obtained. According to this, the Hanseatic trading house had as of 1 November that year, among others, “two alligators [presumably *Alligator mississippiensis*], measuring 4–5 feet in length. Three *Boa constrictor*, 5–7 feet long; Six Indian pythons [*Python reticulatus*, *P. molurus* or *P. bivittatus*], 6–11 feet long, [and] five Senegal pythons [*P. sebae*], 7–14 feet⁶ long [i.e. approximately 200–400 cm].” The second interesting list summarizes the animals sold by Carl Hagenbeck between 1866 and 1872. In addition to “61 elephants, 36 giraffes and 3 rhinoceroses”, it lists “342 large snakes and 252 crocodiles”, among many others.

Only a few years later, the total number of animals imported by Hagenbeck had reached 200 elephants, 300 giraffes and 10 rhinos, among many others. The number of reptiles imported was estimated at around 2,000 (Anonymous 1880). This report was accompanied by a woodcut based on a drawing depicting the unpacking and weighing of a shipment of newly arrived reptiles at the premises of C. Hagenbeck’s menagerie in Hamburg (Fig. 4). The shipment consisted of charismatic large reptile species such as various giant snakes (*Boa constrictor*, different pythons, and an anaconda supposedly measuring 25 feet, i.e. more than 7 meters), about 20 alligator and snapping turtles (allegedly weighing up to 144 pounds, i.e. 65kg), as well as more than 80 Mississippi alligators and black caimans.

By 1886, Hagenbeck’s company had attracted so much international attention that a reporter from London’s ‘*The Era*’ magazine visited and interviewed him (Anonymous 1886). At that time, “the snake collection included thirty-two snakes, amongst them being an Indian python [*Python*

reticulatus?], 22ft. long [= 6.7m], and weighing 130lbs. There were also some specimens of the giant lizard [*Varanus salvator*] (...)” Supposedly, these were “(...) the first which have been brought [alive] to Europe. The biggest, an enormous creature, measuring 7ft. 5in. long [= 2.2m], and weighing 80lbs., was caught in the swamps near Calcutta.”⁷ In addition, it was mentioned that Hagenbeck generally offered skeletons and dead animals to museums (see below).⁸

Johann von Fischer (1849/50–1901), who is often referred to as the founder of terrarium science and herpetoculture thanks to his pioneering book “*Das Terrarium, seine Bepflanzung und Bevölkerung – Ein Handbuch für Terrarienbesitzer und Tierhändler*” (von Fischer 1884), appears to have had extensive knowledge of the (Hamburg) animal and pet trades, thanks to his own experiences in animal husbandry and through business connections.⁹ At the beginning of the systematic section on “The Population of Terrariums” (die Bevölkerung der Terrarien) and their sources

of supply, he wrote (in translation): “Umlauff in Hamburg (Spielbudenplatz 8) and Carl Hagenbeck are the main suppliers of exotic reptiles. Almost all imported reptiles can be obtained from these two important continental companies” (von Fischer 1884).¹⁰

In the following, von Fischer (1884), who according to his own statement had almost 20 years of experience in the keeping and breeding of amphibians and reptiles, wrote the green iguana, among other things, “(...) is imported every year by C. Hagenbeck, Ch. Jamrach, Abrahams, [Heinrich] Möller [also in Hamburg, Spielbudenplatz 21], J.T.G. [sic] Umlauff and many others (...)” He also stated that “the few snake species found in the trade can be easily and cheaply obtained from Karl Hagenbeck and J.F.G. Umlauff in Hamburg (...)”.

As outlined above, the widespread sensationalism and circulation of horror stories about man-eating giant reptiles, crocodiles, alligators, and giant snakes played an important role in Carl Hagenbeck’s animal trading business.¹¹ Accordingly, Hagenbeck (1909) devoted several pages in his biography to describing the extraordinary devour performance of large specimens, recounting, for instance, how he had narrowly escaped with his life several times when attacked by a giant snake (Fig. 5). He also described how snake tamers were part of every circus and menagerie in the 19th century (see Koch et al. 2017 for an example of an Indian ethnological show), and stated receiving 276 *Python bivittatus* in one day,¹² which were sold “like hot cakes, mostly to America.” Elsewhere in his biography, Hagenbeck (1909) summarized that “(...) more than 2,000 crocodiles had passed through his hands.”¹³ In contrast to the living goods, he mentioned



409 7.

Das Bild für die

157

Fig. 4. Woodcut of a historical scene from Anonymous (1880) with the translated caption “Unpacking and weighing a shipment of reptiles at the premises of C. Hagenbeck’s commercial menagerie in Hamburg. Original drawing by Jean Bungartz [1879].” See the text for more details about this shipment. In the center at the scale is Carl Hagenbeck, next to him with a net is his father, the company founder (Niemeyer 1972).

two large stuffed gharials as outstanding specimens, which travelled through Europe as part of his reptile menagerie and which were finally sold to the Natural History Museum Vienna. They are still a special attraction in the museum’s reptile hall today (see below and Fig. 14).

By comparing several historical price lists from “Carl Hagenbeck’s Handelsmenagerie und Tierpark” (Hagenbeck’s trade menagerie and zoological garden), we can illustrate the range and extent of the reptiles (and amphibians) that he traded. The first price list I came across was published anonymously in 1881 in the popular animal keeping magazine “Der Zoologische Garten” (the zoological garden), which still exists today. The reptiles (including amphibians) appear at the end of the list, with an eight-foot-long “Siamese crocodile” (presumably *Crocodylus siamensis*), advertised as a great rarity for 750 marks, at the beginning. This is followed by 15 alligators measuring between 1.25 and 6 feet in length and priced between 20 and 100 marks.¹⁴ Six unspecified “spiny lizards from the Cap” (perhaps *Smaug* sp.), the only lizard species on offer, cost 20 marks each, while four bullfrogs, the only amphibians, were sold for 25 marks each.¹⁵ Nine snake

species follow, with giant snakes clearly dominating. Among them was a “Javanese giant snake” (*Python schneideri* [= *P. reticulatus*]), 14 feet long, priced at 600 marks. Twenty-six *Python bivittatus*, measuring between 7 and 11 feet, were priced at between 100 and 250 marks; eight *Python sebae*, measuring between 9 and 16 feet, were priced at between 100 and 750 marks. A total of 53 “tiger pythons” were listed at between 60 and 100 marks; 12 “Königs-Pythons” (*Python regius*) at between 25 and 40 marks each; and 14 *Boa constrictor* at between 30 and 150 marks. Additionally, a 9-foot-long “water snake, *Eunectes murinus*” was offered for 200 marks, while a “Brazilian rattlesnake” cost 60 marks. The cheapest of all was the “Hornviper” (probably *Cerastes cerastes*), at only 10 marks.

On another price list published by Carl Hagenbeck in 1883 (see Fig. 6 and Leutemann 1883: 38) the reptiles were listed under the heading “Alligators” after the mammals but prior to the birds. Mississippi alligators were offered in various sizes, from 2–10 feet (approx. 57–280 cm) in length, for 10 to 350 marks. This would correspond to about 80–2,800 euros or 95–3,300 US-dollars today. A 6-foot-long “Mexican

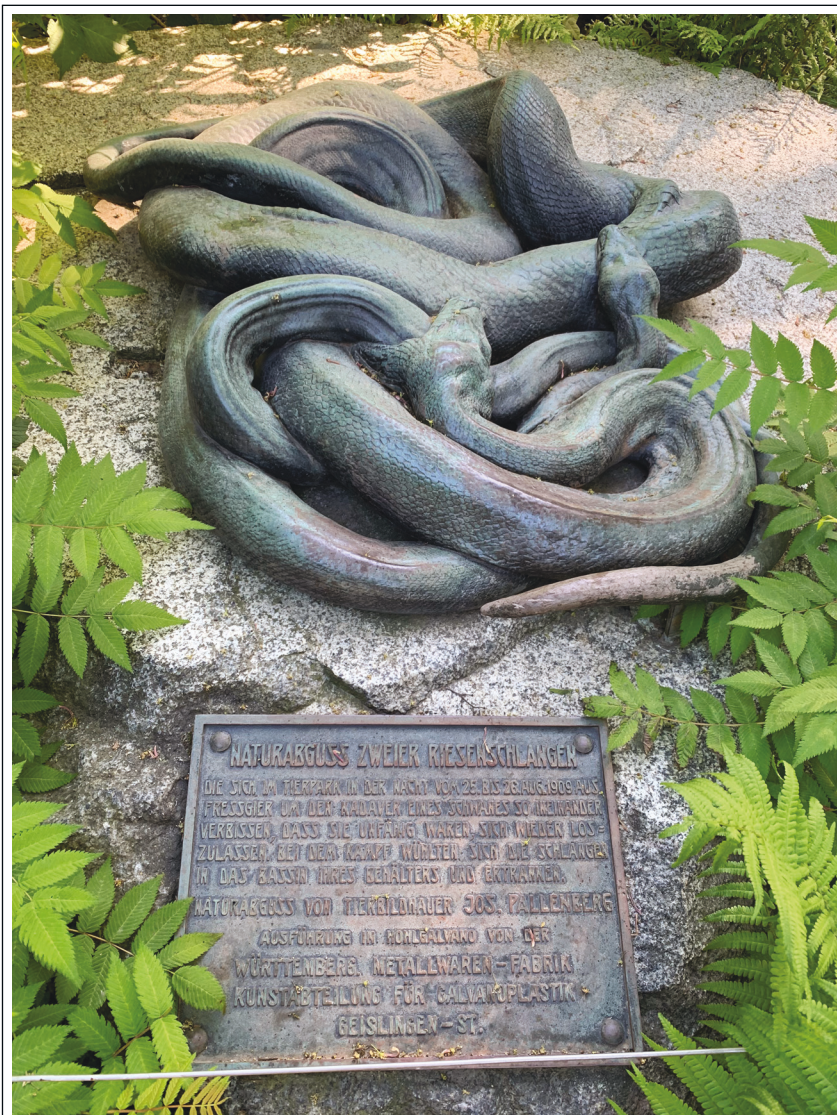


Fig. 5. Bronze sculpture of two giant snakes in Hagenbeck's zoo. The translation of the plaque reads as follows: "Natural casts of two giant snakes which, out of greed, bit into each other over the carcass of a swan in the zoo on the night of 25th to 26th August 1909 to such an extent that they were unable to let go. During the fight, the snakes burrowed themselves into the basin of their container and drowned. Natural cast by animal sculptor Jos[ef]. Pallenberg [1882–1946]. Execution in hollow galvanisation by Württembergische Metallwaren-Fabrik. Art department for galvanoplastics. Geislingen-Stuttgart."

crocodile" was marked as already sold for 125 marks. Next came several alligator or common snapping turtles (*Macrochelys* sp. and *Chelydra* sp.) weighing 30–125 pounds (i.e., 13.6–56.7 kg) or 4–26 pounds (i.e., 1.8–11.8 kg), and "Mexican swamp turtles"¹⁶ weighing 4–7 pounds (i.e., 1.8–3.2 kg), for which 1–2 marks per pound were charged. While the alligators and turtles were clearly focused on North America, the giant snakes on offer came from various continents. In terms of numbers, "giant pythons", probably reticulated pythons, dominated, ranging from 8–23 feet (i.e. approx. 230–650 cm) in length and costing 100–2,000 marks, the equivalent of around 800–16,000 euros or 940–18,800 dollars, respective-

ly! By contrast, "tiger pythons" of 7–8 feet in length (probably *Python molurus* and *P. bivittatus*), also from Asia, cost only 60–80 marks; "*Python-Sebrae*" (sic!) of a similar length from Africa cost 100 marks and *Boa constrictor*, the only reptile species besides the rock python to be listed with a scientific name, cost 40 marks. For comparison, the most expensive item in this price list was an adult female hippopotamus at 18,000 marks (around 144,000 euros or 170,000 dollars), while two rhinoceroses were available for 10,000–12,000 marks each (i.e., 80,000–96,000 euros or 94,000–113,000 dollars, respectively)! However, according to the catalogue, all three specimens had already been sold.

Fifteen years later, by December 1898, Carl Hagenbeck's range of species traded had grown considerably, both geographically and taxonomically (Fig. 7). This expansion was evident not only in the reptile section, which had been moved again to the end of a six-page price list, but also in the variety of other species offered. The list began with "75 [Mississippi] alligators" of various sizes, ranging from 1 to 10.5 feet in length, priced at 10 to 500 marks each (approximately 80 to 4,000 euros or 95–4,700 dollars). Next came two "Indian crocodiles", 6–7 feet long, priced at 150 and 170 marks respectively, a crocodile from Ceylon, 7 feet long, priced at 170 marks, five Nile crocodiles, 2.5–4 feet long, priced at 35–60 marks, and two "Spitzschnauz-Krokodile", probably *Crocodylus acutus*, with similar specifications (Hagenbeck 1898). While the crocodiles were listed almost exclusively by their German common names, also the scientific names were used for all turtles and squamates, which was otherwise only the case for a few hoofed mammals and kangaroos on the list. Several monitor lizard species from Asia, Africa and Australia were new additions to the reptile range, namely *Varanus salvator*,

V. varius, *V. griseus*, *V. dumerilii* (followed by a question mark indicating that this identity was uncertain), and *V. niloticus*. Unlike the crocodiles and giant snakes, whose lengths were measured in feet, the monitor lizards were measured in metric units. Three water monitor lizards, called "Cobragoya" and presumably originating from Sri Lanka, cost 250 marks each at 1.5 meters in length, while eight desert monitor lizards were available for as little as five marks.¹⁷ In addition, two South American "*Tejus Teguxin*", measuring between 0.65 and 1 meters in length, were offered at 30 and 45 marks. Seven Australian spiny-tailed skinks (*Egernia cunninghami*) and twelve "*Cyclodus [= Tiliqua] gigas*" were offered at

15–20 marks. According to Zukowsky (1954), even years later, bluetongue skinks, shingle-back lizards, and Cunningham's skinks made up the majority of 300 Australian reptiles that he had to receive and identify on his first day at Hagenbeck, on 28 June 1913, in the port of Hamburg, along with many other animals from Down Under such as kangaroos, emus, and hundreds of small birds.

Whereas only two large North American turtle species were represented in Hagenbeck's trade menagerie in 1883, by 1898 twelve species from the Americas, Europe, Asia, and Australia were present. The European species predominated in terms of quantity, with 266 *Clemmys* (= *Mauremys*) *caspic*, 158 "*Emis luttaria*" (= *Emys orbicularis*) and 207 *Testuda* (sic) *mauritanica* (presumably *Testudo graeca*) being sold. These were sold for just 0.50–2 marks each. Meanwhile, sixteen Australian snake-necked tortoises ("*Chelodina longicollis*") cost 10 marks each, eight South American "*Platemys geoffroana*" (= *Phrynops geoffroanus*), 10–20 marks each, and two "radiated tortoises, *Testudo* [= *Astrochelys*] *radiata*", with an upper shield length of 0.5 meters, 25 marks each.

The giant snakes still dominated among the snakes, with twelve "*Python reticulata*" [sic!] at similar prices to those in 1883 (see above). The largest specimens, measuring 23 feet in length, still commanded a price of 1,500 marks. Also from Southeast Asia, three *Python bivittatus* and five *Python molurus* were offered at a maximum of 400 and 150 marks, respectively. In addition, two African *Python sebae* were listed for 40 and 75 marks (6 and 10 feet long, respectively), as well as six South American *Boa constrictor* for 35–60 marks and one *Boa occidentalis* (today a subspecies of the previous species). Nine *Boa* (= *Acrantophis*?) *madagascariensis* were listed at up to 90 marks each. Four "Madagascar sword snakes (*Corallus* [= *Sanzinia*] *madagascariensis*)" of 5–6 feet in length were also offered at 60 marks each. The final item on the price list, and among the reptile section, was the only amphibian species: a 90 cm giant salamander priced at 100 marks. The names of all the boas and pythons, as well as this extraordinary amphibian species, are highlighted in bold in the typeface, which otherwise only applies to the alligators and crocodiles at the beginning.

On a fourth, seventeen-page price list from 1914 (Fig. 8), so one year after Carl Hagenbeck's death, the 'Reptiles' appear on the last two pages (Hagenbeck 1914). Compared to the other vertebrate groups traded, these seem to have lost importance. This time, the "Snakes" section is at the beginning

Aligatoren.			
2 à 10 Fuss lang	à Stück	350	
3 à 9 »	»	250	
2 à 8 »	»	250	
3 à 6 »	»	100	
37 à 2–4 Fuss lang	à Fuss	10	
† 1 mexikanisches Krokodill, 6 Fuss lang	»	125	
11 Aligator-Schildkröten, 30–125 Pfund schwer	à Pfund	1	
10 Schnapp-Schildkröten, 4–26 Pfund schwer	»	2	
Mexikanische Sumpf-Schildkröten, 4–7 Pfund schwer	»	1	
41 Riesen-Pythons, circa 8 Fuss lang	à Stück	100	
35 do. 9–10 »	»	150	
3 do. à 12 »	»	350	
4 do. à 14–15 »	»	800	
2 do. à 23 »	»	2000	
31 Tiger-Pythons, 7–8 »	»	60–80	
3 Python-Sebae, à 8–9 »	»	100	
1 do. 3 1/2 Fuss	»	20	
1 Boa constrictor, 5 »	»	40	

Fig. 6. Extract on "Alligators" respectively reptiles from a "Preis-Verzeichniss jetzigen Thivorrathes" (price list of current animal stock) of the Carl Hagenbeck company dated 16 October 1883. For more information, see the text. Courtesy Hagenbeck Archive, Hamburg.

	Mark		Mark
1 Wüstenwaran, <i>Varanus species</i> (Dumerili?)	75	1 Pfauenaug-Schildkröte, <i>Sternotherus sinuatus</i>	6
2 Warane (Nilwarane), <i>Varanus niloticus</i> , 0,70 m lang.	25	1 Tafel-Schildkröte, <i>Testudo tabulata</i>	8
2 Teju-Eidechsen } 0,65 m lang {	30	2 Strahlenschildkröten, <i>Testudo geometrica</i> , obere Schildlänge 0,50 m, à Stück	25
Tejus Teguxin } 1,— m lang {	45	pr. Stück 80 100 150 500 Mk.	
7 Stachelskinke, <i>Egernia Cunninghami</i> , à Stück	20	18 20 23 Fuss lg.	
12 austral. Skinke, <i>Cyclodius gigas</i> ... à Stück 15–20		800 1000 1500 Mk.	
3 Alligator-Schildkröten, <i>Chelydra serpentina</i> à Stück	10	3 Python bivittatus: 10 14 Fuss lang	
8 Plattschildkröten, <i>Platemys geoffroyana</i> , à Stck. 10–20		pr. Stück 100 400 Mk.	
266 caspische Sumpf-Schildkröten, <i>Clemmys caspica</i> ... à Stück	1–2	5 Python molurus: 9 10 12 Fuss lg.	
158 Sumpfschildkröten, <i>Emis luttaria</i> , à Stück 0,50–1		pr. Stück 50 80 150 Mk.	
207 maurische Landschildkröten, <i>Testudo mauritanica</i> ... à Stück 0,50–1		2 Python sebae: 6 Fuss lg. 40 Mk., 10 Fuss lg. 75 Mk.	
7 gemalte Schildkröten (<i>Clemmys picta</i>) à Stück	3	6 Boa constrictor: 5 6 7 8 Fuss lg.	
1 Ceylon-Sumpfschildkröte, <i>Clemmys trjuga</i> ...	5	pr. Stück 35 40 50 60 Mk.	
1 mexicanische Sumpfschildkröte, <i>Clemmys irrigata</i>	5	9 Boa madagascariensis: 5* 6 7 8 Fuss lg.	
16 Schlangenhals-Schildkröten, <i>Chelodina longicollis</i> ... à Stück	10	pr. Stück 60 70 80 90 Mk.	
		1 Boa occidentalis: 8 Fuss lang, 100 Mk.	
		4 Madagaskar Schwertschlangen, (<i>Corallus madagascariensis</i>) 5–6 Fuss lang, à Stück 60 Mk.	
		1 Riesensalamander, 0,90 m lang, 100 Mk.	

Fig. 7. Extract about lizards, turtles, (giant) snakes and one giant salamander from a price list by Carl Hagenbeck dated 1898. Courtesy Hagenbeck Archive, Hamburg.

and features two "Hieroglyphenschlangen, *Python sebae*",¹⁸ measuring 14–16 feet and priced at 550 marks each. This is followed by an 8-foot-long "Tigerschlange, *Python molurus*" priced at 80 marks, and various "Königsschlangen, *Boa constrictor*", priced from 25 marks for a three-foot specimen to 90 marks for a nine-foot specimen. The final snake species offered was the reticulated Python (*Python reticulatus*), five specimens measuring between 14 and 22 feet, priced between 250 and 1,800 marks.

Zukowsky (1954), who worked for Hagenbeck from 1913 until 1931, recalled that "giant snakes usually arrived in shipments of 200. In the reptile house's keeper's corridor, there was an 8-metre-long measuring device on the wall, divided into 25-centimetre increments, which was used to measure the snakes. The reptiles were taken out of the transport containers one by one, stretched out by several keepers and held against the measuring scale, their length noted, and animals

— 16 —		Mark
Kanadische Gänse, <i>Branta canadensis</i>	Paar	120.—
Kurzschnabelgänse, <i>Anser brachyrhynchus</i>	Paar	60.—
Enten.		
Brandenten, <i>Tadorna tadorna</i>	Paar	14.—
	6 Paar	75.—
Rostenten, <i>Tadorna casarca</i>	Paar	80.—
Moschusenten, <i>Cairina moschata</i> var. <i>alba</i>	Paar	20.—
Weisse Mignonenten, <i>Anas domestica</i> var.	Paar	18.—
Pfeifenten, <i>Mareca penelope</i>	Paar	20.—
Stoockenten, <i>Anas boschas</i>	Paar	20.—
Löffelenten, <i>Spatula clypeata</i>	Paar	22.—
1 Paar Sichelenten, <i>Anas falcata</i>	Paar	30.—
Peposaka-Enten, <i>Metopiana peposaca</i>	Paar	60.—
Chilenische Spiessenten, <i>Dafila chilensis</i>	per Stück	20.—
1 Paar Knäckenten, <i>Querquedula cirica</i>	Paar	20.—
Krickenten, <i>Querquedula crecca</i>	Paar	20.—
Japanische Krickenten , <i>Nettion formosum</i>	Paar	25.—
	10 Paar	200.—
Mandarinenten , <i>Aëx galariculata</i>	Paar	45.—
Braut- oder Karolin-Enten , <i>Aëx sponsa</i>	Paar	40.—
	10 Paar	375.—
Gelbe Baumenten, <i>Dendrocygna fulva</i>	Paar	60.—
1 Herbstente, <i>Dendrocygna autumnalis</i>		30.—
Reptilien.		
Schlangen.		Per Stück
		Mark
2 Hieroglyphenschlangen, <i>Python sebae</i> , 14–16 Fuss lang	per Stück	550.—
1 Tigerschlange, <i>Python molurus</i> , 8 Fuss lang		80.—
Königsschlangen , <i>Boa constrictor</i>		
3 Fuss lang		25.—
4 " "		30.—
5 " "		40.—
6 " "		50.—

— 17 —		Per Stück
		Mark
7 Fuss lang		60.—
8 " "		75.—
9 " "		90.—
Gitterschlangen , <i>Python reticulatus</i>		
14 Fuss lang		250.—
16 " "		750.—
18 " "		1000.—
20 " "		1600.—
22 " "		1800.—
Fischmolche.		
Japanische Riesensalamander, <i>Cryptobranchus japonicus</i> ,		
35–85 cm lang		75.— bis 125.—
Krokodile.		
Nilkrokodile , <i>Crocodylus niloticus</i> , 30–60 cm lang, 15.— bis 40.—		
1 Stumpfschnauzkrokodil, <i>Osteolaemus tetraspis</i>		—
1 Spitzschnauzkrokodil, <i>Crocodylus cataphractus</i>		—
Schildkröten.		
Griechische Landschildkröten, <i>Testudo graeca</i>	1.— bis 5.—	
Schwarze Wasserschildkröten, <i>Sternotherus mger</i>	5.— bis 12.—	
Moschusschildkröten, <i>Cinosternum odoratum</i>	10.— bis 15.—	
Flussschildkröten, <i>Emys orbicularis</i>	1.— bis 2.—	
Horsfieldschildkröten, <i>Testudo horsfieldi</i>	5.— bis 8.—	
Karolinische Dosenschildkröten, <i>Cistudo carolina</i>	10.—	
Rotgemalte Schmuckschildkröten, <i>Chrysemys picta</i>	8.— bis 15.—	
Gelbpunkt. Sumpfschildkröten, <i>Chelopus guttatus</i>	8.— bis 15.—	

Fig. 8. The last two pages with the "Reptiles" of a seventeen-page price list from 1914 of the Carl Hagenbeck company. Compared to previous lists, the importance of crocodiles had decreased significantly, only three species were offered. Courtesy Hagenbeck Archive, Hamburg.

of the same length placed in the same containers so that there was no need for lengthy measurements when shipping them. I believe I saw 2000 giant snakes at Hagenbeck (...).

Once again, the only amphibian species in the price list of 1914 was the Japanese giant salamander "*Cryptobranchus* [= *Andrias*] *japonicus*", categorized under the umbrella term "Fischmolche" (fish newts). An undisclosed number of specimens, 35–80 cm long, cost 75–125 marks each.

Compared to previous lists, the importance of crocodiles had decreased significantly. Only three species remained: the Nile crocodile ("*Crocodylus niloticus*"), the "Stumpfschnauzkrokodil" (*Crocodylus* [= *Osteolaemus*] *tetraspis*) and "*Crocodylus* [= *Mecistops*] *cataphractus*". The latter two species were available for 40 euros or 47 dollars each, while the young Nile crocodiles, measuring 30–60 cm in length, were priced at 15–40 marks.

In the 'Turtles' section, large species from previous price lists had disappeared. Instead, only small tortoise and turtle species can be found. The cheapest were "Griechische Landschildkröten" (*Testudo graeca*) at 1–5 marks and "Flussschildkröten" (*Emys orbicularis*) at 1–2 marks. Information

on size and the number of specimens available was not provided for these European species, nor for the following species: "Schwarze Wasserschildkröten" (*Sternotherus* [= *Pelusios*] *niger*) from Africa, priced at 5–12 marks, and the North American "Moschusschildkröten" (*Cinosternum odoratum* = *Sternotherus odoratus*), "Karolinische Dosenschildkröten" (*Terrapene carolina*) and "Gelbgepunkt. Sumpfschildkröten" (*Chelopus guttatus* [= *Clemmys guttata*]). Prices varied from 8–15 marks per piece.

Exceptionally, information exists about the origin and conditions of captivity of another tortoise species that was probably first listed in Hagenbeck's catalogues. This is *Testudo horsfieldi*, which was advertised for 5–8 marks. Zukowsky (1954: 11) recounted how the 'Siberian traveler' Neschiwoff (dates unknown) delivered a large shipment of animals to Stellingen on Pentecost Saturday in 1914. Among them were "(...) no fewer than 8,000 Horsfield's tortoises [Fig. 9], neatly packed in sacks (...). Since the Russian insisted on being paid for these animals piece by piece, provided they arrived alive, they had to be counted, and this in the middle of the preparations for the Whitsun festival. There was no choice but for



Fig. 9. This black-and-white photograph, taken from an old photo album in the Hagenbeck Archive, shows hundreds of Horsfield's tortoises which arrived at Hagenbeck's Zoo on Pentecost Saturday in 1914, ready to be sold to visitors. See the text or Zukowsky (1954: 11) for more information. Courtesy Hagenbeck Archive, Hamburg.

Heinrich and Lorenz Hagenbeck, Paul Mehrmann, Fritz Wegner, and myself to set about this task, which was sometimes not entirely appetizing, as the carcasses of these armored animals that had died and decomposed during the journey simply spilled out when lifted, spreading a pungent odor. The turtles were offered for sale to the zoo visitors during the Whitsun holidays, with the largest ones costing 80 pfennigs, the medium-sized ones 50 pfennigs, and the smallest ones 30 pfennigs. As the smallest ones sold like hot cakes, Heinrich Hagenbeck ordered that the turtles be sold in reverse order of price. Despite this increase in price, most visitors still opted for the small animals, so we were left with the large ones.”

Although Zukowsky (1954) did not provide any illustrations for his “Little Hagenbeck Memories” (“Kleine Hagenbeck-Erinnerungen”), there is a black-and-white photograph in an old photo album in the Hagenbeck Archive (Fig. 9) showing hundreds, perhaps even thousands, of Horsfield's tortoises, recognizable by their flat, rounded carapaces. The countless tortoises, often piled on top of each other, cover almost the entire approximately 60-square-metre fenced enclosure, which shows no signs of feeding or drinking areas.

CARL HAGENBECK'S REPTILE EXHIBITIONS

According to Dittrich and Rieke-Müller (1998), reptile exhibitions helped to make the Hagenbeck brand popular—as well as reptiles themselves—before specialized pet shops were established in German cities (Fig. 10). Carl Hagen-

beck's first reptile exhibition¹⁹ took place at the Düsseldorf Zoological Gardens during a trade and art exhibition in 1880 under the direction of the herpetophile Johann von Fischer (see above). His second exhibition was held at Dresden Zoo the following year. From 1882 onwards, reptiles from Hamburg were exhibited simultaneously in various European cities. For example, Basel Zoo, which at the time only had five reptiles of four species, exhibited a series of large snakes from Hagenbeck from 27 June to 12 July in that year. Due to bad weather, however, the event was not as successful as expected (Anonymous 1883). Schubert (1883) reported that a collection of giant snakes (which he referred to *Boa constrictor*), owned by the animal dealer Hagenbeck, were a main attraction of the Berlin Aquarium. One of these reptiles – which obviously was not a *B. constrictor* – even laid eggs, from which a young hatched but died after 14 days, as the author went on to recount. In 1879, Hagenbeck had already exhibited an anaconda supposedly measuring eight meters in Berlin (Bellosa et al. 2007). Beginning 1st January 1896, Hagenbeck exhibited various animals at the Copenhagen Zoological Gardens. Among these were several large pythons, sand boas (*Eryx* sp.), and green iguanas, which were particularly notable (Anonymous 1896).

Since Carl Hagenbeck maintained good business relations with the USA, he sought to raise international awareness by attending two world exhibitions on the North American continent: the 1893 World's Columbian Exposition (also known as the Chicago World's Fair) and the 1904 Louisiana Pur-



Fig. 10. Undated historical photograph of the ‘First Northern Predator & Reptile Theatre from Hagenbeck’s Zoo in Hamburg’ (“Erstes Nordisches Raubtier & Reptilientheater aus Hagenbecks Tierpark Hamburg”). According to Dittrich and Rieke-Müller (1998), reptile exhibitions helped to make the Hagenbeck brand popular.



Fig. 11. A historical postcard (before 1905) showing the Vivarium building in Vienna’s Prater Park, with the Giant Ferris Wheel in the background. In April 1897, Carl Hagenbeck opened a large reptile exhibition in the building. Wien Museum Inv. No. 234047, CC0.

chase Exposition (informally known as the St. Louis World’s Fair). Although reptiles played only a minor role in the 1893 “Hagenbeck’s Animal Show” and the 1904 “Carl Hagenbeck: The Zoological Paradise and Trained Animal Circus”, giant reptiles were certainly among the species exhibited. According to Pelc (2000), for example, 16 giant snakes and six large lizards (possibly Southeast Asian water monitors) were shipped, among other species, from Hamburg to St. Louis in June 1904. It is unclear whether they were intended for sale or as replacements for deceased specimens. In 1893, hundreds of stuffed animals, probably also including reptiles,

were exhibited by Hagenbeck next to his “Ethnographic Show”. This zoological collection was prepared by the firm “J. F. G. Umlauff Naturalia Handel und Museum” (natural history trade and museum), which was founded by Johann Friedrich Gustav Umlauff (1833–1889), Hagenbeck’s brother-in-law. The two companies collaborated closely, for instance, when Hagenbeck sent animals that had died in his zoo to Umlauff for taxidermy or skeletonization. In this way, even carcasses could be turned into capital.

The following section discusses in detail a large reptile exhibition by Carl Hagenbeck in the Austrian capital, which was already briefly mentioned by Honegger and Blackburn (2022).

HAGENBECK’S REPTILE EXHIBITION AT THE VIENNA VIVARIUM

The Vivarium, a neo-Renaissance building (Fig. 11), which was destroyed in the Second World War and demolished in 1947, was originally constructed as a public aquarium for the 1873 World Exhibition in the Vienna Prater Park, designed by the zoologist Alfred Brehm (1829–1884). Beginning 1878, reptiles and mammals were also exhibited. In 1888, the aquarium was expanded to include a zoo and was renamed “Vivarium” (Reiter 1999). Ernst Perzina (1870–1929), who later became famous as an animal trainer, acted as inspector of the new endeavor. Among many other species, olms (*Proteus anguinus*) from the famous Adelsberg Cave, the Postojna Caves in Slovenia, were exhibited. However, the lack of interest from the Viennese public and the high maintenance costs forced its closure. Various entrepreneurs had previously tried and failed to utilize the building, but on Easter Sunday 1897, Carl Hagenbeck’s Largest Reptile Exhibition in the World (“Größte Reptilienausstellung der Welt”)²⁰ moved into the Vivarium

(Fig. 12). However, even the creation of an extensive polar landscape in the courtyard of the building, complete with sea lions, penguins, and a young walrus as a special feature, could not compete with Schönbrunn Zoo, which was open to the public free of charge. Consequently, Hagenbeck ceased operations after just 19 months. Nevertheless, the Vivarium reopened in spring 1899, this time under the direction of Inspector Schumann (dates unknown) of the Schönbrunn zoo society. According to Werner (1901), Hagenbeck supplied giant snakes (*Python molurus*, *Python sebae*, and *Boa constrictor*), crocodiles, and a large consignment from Egypt on

this occasion. Many specimens, however, perished during the winter and the orphaned reptile cages were refilled with birds and small mammals. Although numerous new animals were acquired in spring 1900 to fill the empty enclosures, this did not last long, and the Vivarium finally closed on 1st October. The heating was turned off and the last two giant pythons died shortly after each other as Werner (1901) recalled. In 1902, the building was finally acquired by three wealthy Viennese scholars: Hans Leo Przibram (1874–1944), Wilhelm Figdor (1866–1938), and Leopold von Portheim (1869–1947). They established the “Biologische Versuchsanstalt” (biological research centre), dedicated to experimental biology. Paul Kammerer (1880–1926) worked there as a trainee under Przibram from 1903. Later, he became Przibram’s assistant, setting up terrariums and aquariums in which he conducted his renowned manipulated amphibian experiments (Koestler 1971, 1974, Rieck and Bischoff 2001, Böhme 2005). During the Nazi era (1933–1945), the “Biologische Versuchsanstalt” was closed and the Jewish employees were killed in concentration camps, among them Hans Leo Przibram.

As a resident of Vienna, Franz Werner (1867–1939) wrote several detailed articles about the animals in the Vivarium under the management of Carl Hagenbeck (Werner 1897a–c, 1899a, 1901). The well-known Austrian zoologist first praised the redesign of the spacious reptile enclosures, which had once served as sea and freshwater aquariums, although no measurements were provided. He summarized: “The whole arrangement is just as pleasing to the eye of the observer as it seems to be to the numerous inhabitants.” Werner (1897a) also decidedly described the initial animal population of the Vivarium as visitors encountered them in the various rooms. He began with the large iguanas (*Iguana tuberculata* [= *I. iguana*] and *Ctenosaura acanthura*), which he noted were sluggish due to the lack of sunlight. These were followed by various giant snakes, amongst others Indian Pythons (*Python molurus*), notable for their considerable size. “The largest specimen is probably just under eight meters in length”, he wrote, noting that “the colossal heads of these animals were counted repeatedly by the large crowd of visitors surrounding the cage of these giant snakes, who wanted an idea of how many snakes were in the enormous mass.” At the same time, Werner (1897a) noted differences between lighter and darker animals, which subsequently prompted him to establish new forms (see below). Other species exhibited were *Python sebae* and *P. regius*, the latter represented by a small specimen that died shortly afterwards, as well as *Corallus* (= *Sanzinia*) *madagascariensis*, which he described as good-natured, in contrast to some *P. molurus*.

In a second bright room containing five large and two small cages, several varieties of *Lacerta* [= *Podarcis*] *muralis* were initially socialized together with *L. agilis* and several *Uromastix hardwickii*. Another terrarium was inhabited by numerous green anoles (*Anolis carolinensis*), which, according to Werner (1897a), were “among the most interesting animals in the Vivarium” due to their lively behavior and color changes. “All this captivates the interest of spectators to the

Eröffnungs-Anzeige.
VIVARIUM
 II. k. k. Prater, Hauptallee 1.
 Direction: **Karl Hagenbeck.**
 Eröffnung: **Ostersonntag, 18. April 1897.**
Grösste Reptilienausstellung der Welt
 in künstlerisch ausgestatteten Käfigen.
60 Riesenschlangen von 6–28 Fuss Länge.
 Riesenschlangen mit Jungen. **Riesenkrokodile** und
Alligatoren mit Jungen. Hunderte von **Schlangen**,
Echsen, **Schildkröten**, **Frösche**, **Mol-**
chen etc. in den verschiedensten europäischen und
 überseeischen Arten.
 Geöffnet täglich von 9 Uhr Früh bis Abends.
 En'ree 30 kr., Kinder 15 kr. 325

Fig. 12. Opening advertisement for Karl Hagenbeck's supposedly 'Largest Reptile Exhibition in the World' at the so-called Vivarium in the Vienna Prater in the newspaper "Wiener Caricaturen" of 18 April 1897.

highest degree, and one could watch these charming lizards for hours”, he wrote enthusiastically and claimed that these little reptiles had certainly cured many a Vivarium visitor of their aversion to the reptile world. In the next tank, over a hundred specimens of the Balkan green lizard (*Lacerta viridis* [= *trilineata*] *major*) could be seen enjoying that year's abundance of cockchafer (*Melolontha* sp.) and looking fattened up. This observation suggests that the high losses at that time were also due to excessive over-stocking, as Werner (1897a) described, “there is constant scuffling and hunting”, as most of the specimens were males.

Some chameleons were housed in two other terrariums: three magnificent *Chamaeleo* (= *Furcifer*) *pardalis* from Madagascar, whose color change Werner admired, and some *Ch. vulgaris* (= *Ch. chamaeleon*), of which merely nine of the original thirty specimens were still alive. The latter were joined by “an old ocellated lizard [*Timon lepidus*?] from the former Vivarium's stock, which, like the large giant salamander, does not seem to have suffered any damage over time.” The Madagascar chameleons shared their enclosure with a young and lively green iguana (*Iguana tuberculata* = *I. iguana*). *Psammmodromus algirus*, *Acanthodactylus vulgaris* (= *A. erythrurus*) and wall geckos (*Tarentola mauritanica*) were also on display in this room.

The next room contained a pool which was home to four enormous alligators. The back wall was covered with small, pretty cages containing beautiful specimens of southern European and native snakes, such as *Tarbophis* (= *Telescopus*), *Coelopeltis* (= *Malpolon*), *Zamenis* (= *Hierophis*) *gemonensis*, *Z. carbonarius* (= *H. viridiflavus*) and *Tropidonophis dahlii*, *Coluber* (= *Zamenis*) *longissimus* and *C. leopardinus* (= *Z. situla*), *Tropidonotus* (= *Natrix*) *natrix* and *N. tessellatus*. In the last of these cages, there were two interesting snakes from Madagascar: *Dromicodryas quadrilineatus* and *Ithycyphus goudoti*. Werner (1897a) regarded these two spe-

cies as confirmation of his belief that “Madagascar reptiles are the most persistent tropical reptiles in captivity”.

This room was followed by a dark corridor with large wall terrariums. In the first of these, as well as a young Nile crocodile and a larger African slender-snouted crocodile, there were five beautiful but apparently quite vicious Australian lace monitor lizards (*V. varius*), two mighty water monitor lizards (*V. salvator*), as well as numerous enormous *Testudo* (= *Astrochelys*) *radiata*, *Cinixys* [= *Kinixys*] *belliana* and a *Testudo* (= *Geochelone*) *elegans* from Ceylon—a wild mixture indeed! In the next containers, there were some magnificent *Boa constrictor*, which, a rarity for this species in captivity, as he noted, had almost all made themselves comfortable to eat. There was also a very beautiful anaconda, a large number of *Python molurus*, a large group of European glass lizard (*Ophisaurus* [= *Pseudopus*] *apus*) and, finally, numerous medium-sized alligators aged 3–8 years.

As Werner (1897a) continued, the next room was preferably reserved for amphibians and turtles. A couple of extraordinarily large, beautifully stuffed gharials (*Gavialis gangeticus*), with a strange attachment on the end of the male’s snout, aroused the keenest admiration, even among the most discerning reptile connoisseurs. Specimens like these had probably rarely come to Europe, he assumed. Regarding these two crocodiles Hagenbeck (1909) mentioned: “It would be difficult to catch and transport live gharials of this size. I have tried to import young specimens on several occasions, but they all perished on the journey.”

Regarding the amphibians exhibited in the Vivarium, Werner (1897a) did not provide a detailed list, but noted that the native species are almost completely represented, alongside some familiar exotic species that aquarium and terrarium enthusiasts have long loved, but which are still new to the general public. He merely mentioned two amphibian species by name: bullfrogs, some of which are of a particularly large size, and four Japanese giant salamanders. Regarding the former, Werner (1897a) mentioned that he had acquired a specimen from the Vivarium and briefly described its behavior, while he characterized the latter as “boring, but very hardy creatures in captivity.”

The turtles shared a small aquarium with numerous young alligators. As well as diamondback terrapins (*Malaclemys terrapin*) and various water turtles (*Pseudemys concinna* and *Trachemys scripta*), it housed a large musk turtle (*Sternotherus* sp.), a *Melanochelys trijuga* and a *Mauremys leprosa*. However, Werner (1897a) was not entirely certain about their identification. Next to the gharial rock was a tank containing four alligator snapping turtle (*Macrochelys temminckii*), which he described as “inert, immobile creatures with enormous heads, lying there like stones.” Another tank contained numerous *Clemmys guttata*, several *Chrysemys picta*, Australian snake-necked tortoises (*Chelodina longicollis*), musk turtles (*Sternotherus odoratus*) and Eastern mud turtles (*Cinosternum pennsylvanicum* [= *Kinosternon subrubrum*]). Further turtle tanks were in preparation.

The adjoining room contained several animals that were undoubtedly among the highlights of Hagenbeck’s reptile exhibition. One large terrarium contained a Madagascar boa (*Boa* [= *Acrantophis*] *madagascariensis*), which had given birth to three young on the journey. They were doing very well and eating diligently. Another snake, a *Corallus* (= *Sanzinia*) *madagascariensis*, had also given birth to a young, which however refused to eat and died a week ago. “The marvelous little thing has passed into my possession,” wrote Werner (1897a). Of the numerous other snake species on display in the Vivarium, such as the diamond python (*Morrelia spilota*), the bronze snake (*Dendrelaphis tristis*) and the Eastern mud snake (*Farancia abacura*), he particularly emphasized the beautiful green tree snakes (*Dryophis mycterizans* [probably *Ahaetulla nasuta*], from Ceylon), which, along with the anoles, were among the most captivating species in the exhibition. “They too will have disarmed many a reptilian enemy”, Werner (1897a) assured. He also shared an interesting observation he had made with two *Leioheterodon madagascariensis*: “Two splendid snouted snakes (...), which were always very voracious, unfortunately died a quarter of an hour after eating European green toads [*Bufo viridis*] with great appetite. It is curious that these toads, which were always eaten by *Tropidonotus* [= *Natrix*] species preferably and without any harm, were so fatal to these Malagasy snakes.” The finale comprised two reticulated pythons, one of which he estimated to be over nine meters long.

Werner (1897a), who congratulated the organizers of the exhibition, concluded his detailed descriptions with two recommendations aimed at educating the public. Firstly, he advised against confining different species together, as laypeople were unable to distinguish between them: “Therefore, it makes no sense to present more than one species of monitor lizards.” Alternatively, he recommended stating the distinguishing features or providing a good, albeit sketchy, illustration to help visitors identify the individual species. Secondly, he would like to see more venomous snakes at the exhibition. He also wrote that the first public feeding of giant snakes, monitor lizards, and crocodiles resulted in an unprecedented crowd of visitors and reported from many years of experience that keeping reptiles and amphibians is more difficult than keeping most mammals and birds, because it required a lot of patience, money, skill, and luck.

A few months after the opening of the reptile exhibition, Werner (1897b) provided an update on the animal population at the Vivarium in Vienna. With delight he noted that the exhibits were well received by the public, despite the fact that “[...] precisely those animals are on display which most people detest and loathe as a result of the disgust and horror instilled in them by tradition and education.” According to the scholar, this only proved once again that the public is happy to be instructed and elevated to a more understanding view of the animal world, even the inedible kind, if one takes the efforts to provide this instruction in an interesting and vivid way. Hagenbeck’s exhibition would therefore indeed

have had a positive effect on the perception and acceptance of reptiles and amphibians among the Viennese population and beyond. According to Werner's (1897b) observations, foreigners also visited the Vivarium, which quickly became one of Vienna's sightseeing attractions.

Werner (1897b) began his second report with the tortoises, to which the following new species had been added: *Kinixys homeana* from Central Africa, *Mauremys reevesii* and *Clemmys* (= *Mauremys*) *japonica* from East Asia, *Malacoclemmys lesueurii* (= *Graptomys pseudogeographica*) from the USA, and *Chrysemys* (= *Trachemys*) *ornata* from Mexico, as well as "a beautiful *Testudo tabulata* (= *Chelonoidis carbonarius*?) and two huge spurred tortoises (*T. calcarata* (= *Centrochelys sulcata*) from Central Africa." On the other hand, the Vivarium had suffered a heavy loss with the death of three of the four colossal alligator snapping turtles. Alongside the previous three crocodile species, the Vivarium now displayed "four magnificent Ganges crocodiles", possibly including *Crocodylus palustris* and *C. porosus*. In addition, Werner (1897b) wrote that "two charming young dwarf crocodiles (*Osteolaemus tetraspis*?) have been on display for a short time."

Among the lizards, he mentioned three species of geckos: *Tarentola annularis* and *Ptyodactylus lobatus* (= *P. haselquistii*) from Egypt, and *Tarentola mauritanica*. Franz Werner kept a specimen of the latter species that laid two eggs in May. However, it is unclear whether he acquired the gecko from the Vivarium. Among the agamids, he emphasized six voracious *Physignathus lesueurii* (= *Intellagama lesueurii*) from Australia, which were associated with rock agamas (*Laudakia* sp.) and *Pogona barbata*. The following smaller species were also shown: *Agama sanguinolenta* (= *Trapelus sanguinolentus*) from Russia, *Agama inermis* (= *Trapelus mutabilis*) from North Africa, *Phrynocephalus mystaceus* from Central Asia, *P. raddei* from Afghanistan-Turkmenistan, and *Amphibolurus muricatus* from Australia. The horned lizard, *Phrynosoma cornutum*, from the USA, was presented as a representative of the iguanids. Among the monitor lizards, Werner (1897b) was impressed by the numerous beautiful desert monitor lizards (*Varanus griseus*) from Egypt and Transcaspia, and the newly arrived, mighty Kabaragoyas (*Varanus salvator*), which, like the old ones, knew how to catch the ground squirrels (*Spermophilus* sp.) frequently given to them with great skill. He also mentioned a particularly beautiful young *Varanus dumerilii* and each one specimen of *Varanus niloticus* and *V. exanthematicus* of considerable size.

Werner (1897b) further reported that the lacertids presented thus far "have been considerably multiplied by enormous ocellated lizards from southern Spain." Among the scincid lizards presented were *Tiliqua scincoides*, *Egernia cunninghami*, and an undetermined *Lygosoma* species from Australia, and predominantly African representatives such as sandfish (*Scincus scincus*), wedge-snouted skinks (*Chalcides sepsoides*), and Schneider's skinks (*Eumeces schneiderii*).

Werner (1897b) observed that the latter species, is capable of a distinct color change from light grey to dark brown, with the red and yellow markings remaining unchanged. At the same time, numerous losses were already occurring among the terrarium animals, with only two of the Madagascar chameleons remaining alive, albeit in excellent health, as the zoologist wrote.

Most of the changes were evident among the snakes at the Vivarium. Five more reticulated pythons, "including a wonderful young specimen", and numerous beautiful *Eryx jaculus* were added to the exhibition. The colubrids were represented by water snakes (*Tropidonotus* [= *Fowlea*] *piscator*) from the East Indies (a historical term for the Dutch colonies of present-day Indonesia), Oriental rat snakes (*Zamenis mucosus* = *Ptyas mucosa*) from Sri Lanka, Egyptian diadem snakes (*Zamenis diadema* = *Spalerosophis diadema*) and mighty American rat snakes (*Coluber obsoletus* = *Pantherophis obsoletus*). However, socializing the different species of snake led to cannibalism. Werner (1897b) reported that the American rat snakes "consume not only young chickens, but also diadem snakes with relish." Another problem was the high mortality rate at the Vivarium. For example, it was recorded about the diademed sand snake (*Lytorhynchus diadema*) that "all of them, as well as the four beautiful king snakes (*Lampropeltis*?), the American rat snakes and the *Farancia*, have already died, while the numerous beautiful diadem snakes have largely succumbed to the particularly frequent and murderous mouth rot that occurs in this species." Werner (1897b) found it "(...) inexplicable why the snakes, kept in exemplary conditions, sometimes perished with frightening speed, while the generally much more sensitive lizards suffered only a few deaths and not a single one of the more than one hundred *Anolis* had died."

The green tree snakes (presumably *Ahaetulla nasuta*), whose feeding Werner (1897b) vividly described, also suffered from cannibalism due to overcrowding in the terrarium. When Inspector Perzina, who looked after these marvelous animals with the greatest care according to Werner, threw about 30 live wall lizards in the terrarium, the next moment about 60 snakes pounced on their victims and devoured them once the poison had taken effect. According to Werner (1897b), the snakes seemed to feel extremely comfortable in their home, so much so that they occasionally devoured a smaller specimen of their own species out of sheer comfort. In addition to these public favorites, one of the Vivarium's most popular showpieces was an "uraeus" or "Kleopatra snake" (*Naja haje*), as Werner (1897b) called it, due to its special history. This specimen formerly belonged to a travelling snake tamer who performed with venomous and giant snakes. However, when the venomous fangs of the cobra grew back, the tamer no longer dared to appear with it or to remove its fangs. The director of the vaudeville theatre in question considered the tamer's productions to be too uninteresting and unexciting for the audience without the sensational show act with the "dancing" cobra. Therefore, he

WIENER VIVARIUM									
(Direction: Carl Hagenbeck)									
Wien, II., k. k. Prater, Hauptallee 1.									
WIEN, Datum des Poststempels.									
Das Wiener Vivarium hat gegenwärtig als überzählig in durchwegs tadellosen, acclimatisierten und gut fressenden Exemplaren abzugeben von:									
Eidechsen.									
Mauergecko, <i>Tarentola mauritanica</i>	fl.	1.20 bis fl.	1.80	Mk.	2.— bis Mk.	3.—			
Aegyptische Geckonen, <i>Tarentola annularis et Pseudotylus lobatus</i>		1.80	"	2.40	"	3.—	"	"	4.—
Schleuderschwänze, Hardun's, <i>Agama stellio</i>		3.60	"	"	"	6.—	"	"	"
Wüstenagamen		2.40	"	3.60	"	4.—	"	"	6.—
Agamen aus Transcaspien		4.20	"	5.40	"	7.—	"	"	9.—
" "		2.40	"	3.—	"	4.—	"	"	5.—
" "		6.—	"	—	"	10.—	"	"	—
Indische Dornschwänze, <i>Uromastix hardwickii</i>		6.—	"	—	"	10.—	"	"	—
Afrikanische Dornschwänze, <i>Uromastix spinipes</i>		6.—	"	12.—	"	10.—	"	"	20.—
Rothkehl-Anolis, <i>Anolis carolinensis</i>		2.40	"	3.—	"	4.—	"	"	5.—
Grüne Leguane, <i>Iguana tuberculata</i> , sehr gross		18.—	"	24.—	"	30.—	"	"	40.—
Schwarze Leguane, Wirtelschwanz, <i>Cyclura detinculata</i> , s. gr.		24.—	"	—	"	40.—	"	"	—
Australische Leguane, <i>Physignathus lesuerii</i>		60.—	"	—	"	100.—	"	"	—
Bartechsen, <i>Amphibolurus barbatus</i>		60.—	"	—	"	100.—	"	"	—
Scheltopusik's, <i>Ophisaurus apus</i>		1.20	"	1.80	"	2.—	"	"	3.—
Blindschleichen, <i>Anguis fragilis</i>		—30	"	—	"	—50	"	"	—
Binden-Warane, <i>Varanus salicitor</i> , sehr gross		120.—	"	150.—	"	200.—	"	"	250.—
Australische Warane, <i>Varanus varius</i> , sehr gross		30.—	"	42.—	"	50.—	"	"	70.—
Wüsten-Warane, <i>Varanus griseus</i>		6.—	"	12.—	"	10.—	"	"	20.—
Dumeril's Waran, <i>Varanus dumerili</i>		60.—	"	—	"	100.—	"	"	—
Perl-Eidechsen, <i>Lacerta ocellata</i> , sehr gross		6.—	"	—	"	10.—	"	"	—
Smaragd-Eidechsen, <i>Lacerta viridis</i>		—30	"	—90	"	—50	"	"	1.50
Zaun-Eidechsen, <i>Lacerta agilis</i>		—05	"	—10	"	—10	"	"	—20
Mauer-Eidechsen, <i>Lacerta muralis</i> , in verschied. Varietäten		—05	"	—30	"	—10	"	"	—50
Fransen-Finger, <i>Acanthodactylus vulgaris</i>		1.20	"	1.80	"	2.—	"	"	3.—
Johannis-Echsen, <i>Ablepharus pannonicus</i>		1.50	"	—	"	2.50	"	"	—
Riesen-Skinke, <i>Cyclodius scincoides</i>		18.—	"	—	"	20.—	"	"	—
Stachel-Skinke, <i>Egernia cunninghami</i>		24.—	"	—	"	40.—	"	"	—
Ohren-Skinke, <i>Eumeces Schneiderii</i>		3.60	"	4.20	"	6.—	"	"	7.—
Schlangen.									
Assala-Python, <i>Python sebae</i> } fl. 24.— Mk. 40.— fl. 36.— Mk. 60.— fl. 48.— Mk. 80.— fl. 72.— Mk. 120.—									
Gelbe Python's, <i>Python molurus</i> } 6 Fuss 8 Fuss 9 Fuss * 10 Fuss									
Dunkle Python's, <i>Python bivittatus</i>		von fl. 60.— bis fl. 600.—		Mk. 100.— bis Mk. 1000.—					
Borneo-Python's, <i>Python reticulatus</i>									

Fig. 13. Sales list for Carl Hagenbeck's reptile exhibition at the Vienna Vivarium.

threatened to dismiss the poor tamer, who was so upset that he ran away. However, he left a bag containing the venomous snake in an inn, along with several unpaid debts. When an unsuspecting parlor maid accidentally freed the dangerous snake from its prison, Inspector Perzina had to travel all the way from Vienna to capture it. At that time, the Vivarium had adders and nose-horned vipers (*Vipera ammodytes*?) as well as *Cerastes cerastes* and *C. vipera* from North Africa. Thus, Carl Hagenbeck had followed Werner's (1897a) recommendation for venomous snakes in the exhibition, whether consciously or unconsciously.

As a businessman, Carl Hagenbeck used the exhibition at the Vienna Vivarium to sell amphibians and reptiles that were "currently available as surplus specimens in perfect condition, fully acclimatized and ready to eat" (Hagenbeck, undated [1897/1898], see Fig. 13). Unlike earlier price lists, many

smaller species suitable for private terrarium keeping were included this time, although several species were described as very large specimens. So, size obviously still played an important role. In total, 63 species were offered for sale, including 28 lizard, 26 snake, one crocodile, five tortoise, and three amphibian species. These included olms for 4–6 marks, bullfrogs for 25 marks, and Japanese giant salamanders for 100 marks (equivalent to around 800 euros or 940 dollars, respectively). Orders were to be placed directly with Inspector Perzina on site.

All species offered were given German and scientific names, except for the "American alligators", the "desert agamids" and the "agamids from Transcapia", whose taxonomic identification was apparently unclear. Only two tortoise species, *Cinixys* (= *Kinixys*) *belliana* and *C. homeana*, were not given common names. As in the past, size and origin were the main factors influencing the price. While young native grass snakes (*Natrix natrix*) and dice snakes (*N. tessellata*) were offered for as little as 50 and 80 pfennigs respectively, large Asian pythons cost up to 1,000 marks (approximately 8,000 euros or 9,400 dollars today). Apart from young native sand or wall lizards, which cost just 10 pfennigs, foreign lizards such as wall geckos (*Tarentola mauritanica*), European glass lizard, and fringe-fingered lizard were available for as little as two marks, while large Asian water monitors cost up to 250 marks (around 2,000 euros or 2,350 dollars today). Yellow-spotted turtles (*Clemmys guttata*) from North America were also available for just 2 marks each. Snake-necked tortoises (*Chelodina longicollis*) from Australia and *Kinixys homeana* from Africa

cost 20 marks each. Overall, European and African species dominated Hagenbeck's range at the Vivarium in Vienna; only a few species of South American and Australian reptiles were represented.

In his third report on the Vivarium, Werner (1899a) once again made specific reference to the animal population, mentioning that, among the turtles shown the previous year, there were numerous beautiful *Hydraspis hilairei* (= *Phrynops hilarii*) from Argentina, which, like *Chelodina longicollis*, were some of the most durable and voracious turtles. However, he also noted that one of the two hawksbill turtles from the Gulf of Mexico, "a beautiful creature", was kept alive for a while and even fed, but it did not survive for long, as did a rather handsome *Thalassochelys* (= *Caretta*) *caretta*. He provided a similar negative account of the North American spotted turtle and *Chrysemys picta*, most of which had mean-

while died, thereby highlighting the obvious knowledge gaps that still existed regarding the husbandry conditions of these species at the time.

According to Werner (1899a), there were also losses among the crocodiles on display at the Vivarium. However, he noted that they had generally fared well, which speaks to the popularity of these giant reptiles at the time. Of the various geckos exhibited, Franz Werner was particularly impressed by the Malagasy *Phelsuma laticauda*, writing regretfully: "Of the well over 100 *Phelsuma* specimens, unfortunately only a few survived, and not a single specimen of the other three species [i.e., *Hemidactylus mabouia*, *H. platyurus* and *Gehyra mutilata*] came back to Hamburg alive." Regarding the sandfish skinks, which "crawled towards their inevitable death with resignation", Werner (1899a) stated melancholically: "The reptile keeper who is able to permanently acclimatize this species to captivity has yet to come." And he went on to say: "*Physignathus*, *Heloderma*, *Tiliqua*, *Egernia*, and most monitor lizards have done excellently, on the other hand. Desert monitors, however, are mostly truly miserable creatures, as are some other monitor lizards which I would consider to be *V. bengalensis*—they literally starved themselves to death."

Unfortunately, the snakes in Hagenbeck's reptile exhibition had similarly high mortality rates to the lizards, as the author wrote: "As in the previous year, there was high mortality among the Assalas [= rock pythons]. This year, it was the *Python molurus* that suffered, despite their usual durability. I suspect these truly indestructible snakes were killed by a lack of sunlight or constant, excessively high temperatures.²¹ (...) The beautiful anacondas, all the diamondback snakes and the ball pythons also perished." Finally, Werner (1899a) repeatedly referred to "the charming green tree snakes [presumably *Dryophis mycterizans* (= *Ahaetulla nasuta* from Ceylon), as mentioned in the price list], which caused a sensation the previous year and which the public therefore always asked for." However, he also noted that the tree snakes held out far better this time than in the previous year, but at the same time speculated that they probably all had died on the way back to Hamburg. From a report by the ambitious terrarium keeper Johannes Berg (1901) from Lüdenscheld we learn, however, that this prophecy was not entirely fulfilled. He emphasized the attractiveness of the Asian whip snakes, two specimens of which he had received from Hamburg on 20 May 1899. According to the unnamed dealer, who may have been the Umlauff company, the two snakes came from a consignment of over 100 specimens that Hagenbeck had imported from Ceylon for the Vienna Vivarium about a year earlier, and that these were the only ones to survive. Berg (1901) provided a detailed account of caring for his snakes and critically compared this with information from contemporary literature.

Regarding the amphibians at the Vivarium, Werner (1899a) wrote briefly and laconically that they were "not worth mentioning or had been discussed before."

In his report on the end of the Vienna Vivarium ("Des Wiener Vivariums Ende"), Werner (1899a) also provided a

summary of the total number of amphibians and reptiles exhibited by Hagenbeck in the Austrian capital. According to Franz Werner, a total of 179 species were exhibited in just under two years: This included 32 tortoise, six crocodile, two chameleon, 51 lizard, 54 snake (including 12 giant snake), 17 frog, as well as 17 newt and salamander species. Werner expressed his regret that Hagenbeck's highly interesting reptile exhibition at the Vivarium in the Vienna Prater, which surpassed all continental collections of living reptiles in beauty and richness, had to close. He blamed the lamentable apathy of the Viennese public for this. Additionally, the ban on public snake feedings had driven away many curious visitors (Werner 1901). Nevertheless, he praised Hagenbeck's efforts to promote an interest in the natural sciences among the Viennese public and thanked him on behalf of a small minority for providing "so many opportunities for interesting observations and so many rare reptiles, some of which had never been imported alive before." At the same time, Werner (1899a), who described himself as a regular visitor to the Vivarium, criticized the fact that the public was not interested in seeing new or interesting animal species, but that their viewing needs were completely satisfied by the Arctic Ocean panorama with the young, trained walrus Oskar and by giant snakes and crocodiles. For him and a few other herpetophiles, however, it was precisely these novelties that were the focus of their interest. Unfortunately, it was not possible to trace any photographs of the reptile exhibition at the Vivarium.

HAGENBECK'S INFLUENCE ON REPTILE KEEPERS AND HERPETOLOGISTS

The influence of the Hagenbeck animal trading company on the fields of herpetology and herpetoculture is difficult to assess. Therefore, it is only possible to provide examples of individual terrarium keepers and scientists, and their contributions to the study of amphibians and reptiles, which might not have been possible without the support of this Hanseatic company. The problem is that very few articles mention the dealer from whom the animals were originally acquired. Johann von Fischer, said to have kept 205 species of amphibian and reptile, has already been quoted several times above from his renowned book "Das Terrarium (...)". This suggests that he obtained various species of tortoise (and probably other reptiles and amphibians) from Hagenbeck, as well as from Umlauff and other animal dealers. Von Fischer published over 90 articles about his many years of experience in keeping and breeding amphibians and reptiles in the semi-popular journal "*Der Zoologische Garten*" (Adler 2012). He dedicated his terrarium book to Professor Dr Friedrich Carl Noll (1832–1893), the editor at the time, in friendly reverence. Dr. Arthur Hanau (date of birth unknown) from St Gallen in Switzerland also published a short report on his terrarium pets in the same journal. Having acquired an *Eryx jaculus* from the Vienna Vivarium, he reported on its feeding habits (Hanau 1898).

Another ambitious reptile keeper who provided detailed reports on his observations of several species in captivity around the turn of the century was Pedro de Grijs (or de Grys 1864–1940), a Hamburg merchant (Bischoff 2024). He acquired some species, such as an Australian water dragon (*Intellagama lesueurii*), from Hagenbeck's reptile exhibition at the Vienna Vivarium. De Grijs (1901: 100) described the habits of his persistent pet in detail, whose price was 60–100 marks according to the price list by Hagenbeck (undated [1897/1898]). Later, Franz Werner, Robert Mertens (1894–1975), and Arthur Loveridge (1891–1980) dedicated *Goni-onotophis degrijsi*, *Cryptoblepharus boutonii degrijsi*, and *Cynisca degrijsi* to him. While the former two are synonyms of *Gracililima nyassae* (Günther, 1888) and *Cryptoblepharus quinquetaeniatus* (Günther, 1874), respectively, the latter is considered a valid species today. He is also the author of the rare agamid *Hypsicalotes kinabaluensis* from Borneo (de Grijs 1937).

As can be seen from Franz Werner's (1897a, b; 1899a) detailed articles on the Hagenbeck exhibition in the Vienna Prater, the display of reptile and amphibian species greatly influenced this renowned zoologist.²² We owe him not only a great deal of information about the Vivarium itself, but also about its numerous species exhibited there. For example, Werner (1898) observed the feeding behavior of *Ithycyphus goudoti* at the Vivarium and documented it in an article on "(...) die Giftigkeit der Trugschlangen (Opisthoglypha)". In a report "Über einige noch unbeschriebene Reptilien und Batrachier" (on some as yet undescribed reptiles and batrachians), Werner (1897c) even went so far as to establish a series of new varieties (subspecies) of the dice snake from Transcaspia, based on animals he had previously seen at the Vivarium and received from Inspector Perzina for study. He dedicated the first of these three forms to the initiator of the reptile exhibition, naming it *Tropidonotus tessellatus* (= *Natrix tessellata*) var. *hagenbecki*.²³ On the other side, following his "reptile hunt in Egypt", Werner (1899b) presented two young Nile foxes (*Canis niloticus*) to the Vivarium after providing them with milk and meat.

Elsewhere, Werner (1899c), who was also apparently an avid terrarium enthusiast, made the following statement: "As I already surmised two years ago on the basis of Hagenbeck's living specimens, three distinct varieties of *Python molurus* can be identified: *Python molurus* var. *ocellatus*, *Python molurus* var. *intermedia*, and *Python molurus* var. *sondaica*." The latter taxon was based on a Sumatran specimen that he had seen at Hagenbeck in Hamburg in April 1898.²⁴

In addition, Werner (1900) summarized his observations on the deterioration of already acclimatized giant snakes in captivity and concluded that "such experiences, I have had with various consistently healthy snakes purchased from the Vivarium in Vienna, partly directly and partly second-hand, while the animals purchased from Fockelmann, Stüve, Umlauff, and Breitwieser in Hamburg form the basis of my collection of living boids." This statement indicates that Werner

purchased terrarium animals from various dealers from the city of Hamburg at that time, of which Umlauff and Hagenbeck seem to have been the most important suppliers. For example, Werner (1903) also acquired an anaconda from Hagenbeck. Therefore, it is not surprising that Werner (1912, 1913) referred to Hagenbeck four times in his volume of "*Die Lurche und Kriechtiere*" (the Amphibians and Reptiles) in the famous series "Brehms Tierleben" (Brehm's Animal Life), including once in relation to the extraordinary coiling performance of giant snakes described by Carl Hagenbeck (1909) in his biography. By comparison, de Grijs from Hamburg (see above) is mentioned thirty-five times.

HERPETOLOGICAL SPECIMENS FROM HAGENBECK IN NATURAL HISTORY MUSEUMS

Since large reptile species such as crocodiles, giant snakes, and turtles also attract the attention of visitors in natural history museums, the directors of these research and exhibition facilities, like in zoos, were always interested in acquiring the most spectacular specimens possible, even if in these cases the focus may have been less on scientific content and more on the attractiveness of the exhibits.²⁵ Only two natural history museums shall be mentioned here briefly as examples for Carl Hagenbeck's herpetological legacy.

The extraordinary taxidermy group of two large gharials at the Natural History Museum Vienna (NHMW, Fig. 14) has been discussed in detail by Koch and Schweiger (2023a, b). Although their origin was unknown until recently, Carl Hagenbeck's biography (1909) clearly indicates that these giant crocodile skins were originally part of his reptile exhibitions. Hence, they had been on display in the Prater Park Vivarium in Vienna since Easter 1897 (see above), where the director of the NHMW, Franz Steindachner (1834–1919), most likely saw them alongside Franz Werner (1897a). Steindachner then acquired them for his natural history museum due to their high display value. In addition to these spectacular specimens on display, a search of the herpetological collection database at the museum in Vienna revealed that the name 'Hagenbeck' is mentioned 22 times under 'origin' or 'collector' (Koch and Schweiger 2023a, b).

Also the Senckenberg Museum in Frankfurt obtained large reptiles from Hagenbeck. As early as 1907, the museum purchased a 6.75-metre-long reticulated python from Hagenbeck's Zoo, and its skeleton was exhibited in Frankfurt (Belloso et al. 2007, p. 51). In December 1919, Otto zur Strassen (1869–1961), the museum's director at the time, received a telegram from an unknown employee of Carl Hagenbeck offering him a 6.2-metre-long reticulated python from an animal exhibition in Essen-Rüttenscheid. Zur Strassen purchased the python for 250 marks. Apparently, he had previously requested a specimen measuring 9 meters or an anaconda. The largest reticulated python in the exhibition at the time was said to measure 7.8 meters (Anonymous 1919).



Fig. 14. The two huge Ganges gharials by Carl Hagenbeck and the company J.F.G. Umlauff in Room XXVIII of the Natural History Museum in Vienna are among the largest exhibits of this crocodile species worldwide. Photo.: Wilhelm Bauer-Thell (NHMW).

These herpetological examples could probably be supplemented by many others in natural history collections across Germany and beyond. Together with the other points made in this article, this shows that Carl Hagenbeck's animal trading company has been largely neglected in historical studies of herpetology, herpetoculture, and other research fields, and that its influence on scientists, reptile keepers and the general public deserves greater recognition. This includes the colonial heritage of this Hanseatic animal trading company and others (Andratschke et al. 2024). The author therefore hopes that this article will stimulate further research on this topic.

ACKNOWLEDGMENTS

I wish to express my sincere gratitude to Hermann Reichenbach of the Hagenbeck archive in Hamburg for kindly providing Carl Hagenbeck's price lists and further information, without which a significant part of this article would not have been possible. He also generously allowed the use of a photograph, which Nigel T. Rothfels (Milwaukee) kindly brought to my attention. I would also like to thank Silke Schweiger (Natural History Museum, Vienna) for her cooperation on our joint article about the two gharials from Hagenbeck and owe her information

from the herpetological database. Jakob Hallermann (Museum of Nature Hamburg, LIB) kindly provided literature on Pedro de Grijs and Wolfgang Böhme (Museum Koenig Bonn, LIB) drew my attention to Werner's snake descriptions. Ute Nüsken is acknowledged for generously sending me PDFs of old Hagenbeck magazines and I am indebted to Werner Schwarz of the Wien Museum for checking their collections for photographs of Hagenbeck's reptile exhibition at the Vivarium. And finally, I sincerely thank Wolfgang Bischoff (Magdeburg) for his patience with me on the original German version of this article for the *Mertensiella* volume. The manuscript benefitted from critical comments by Silke Schweiger and René Honegger.

NOTES

1. The name Hagenbeck is not listed in Adler's (1989, 2007, 2012) "Contributions to the History of Herpetology" and it is only shortly mentioned in the two *Mertensiella* volumes by Rieck et al. (2001) and Bischoff (2018), which focus on „the history of herpetology and herpetoculture in German-speaking countries". In reflecting on the impact of the Hanseatic trading house on terrariums and herpetology, I will focus primarily on the time of Carl Hagenbeck (1844–1913). Consequently, the reptiles at Hagenbeck's Zoo will only be discussed in its early years.

2. Founded in 1907, “Tierpark Hagenbeck” (Hagenbeck’s Zoo) should not be confused with the Zoological Garden in Hamburg, which opened already in 1863 as the fifth zoo in Germany. This zoo existed until 1930 and is now the site of the Planten un Blomen park. Werner (1899c) praised the first Hamburg Zoo, saying that it generally impresses him with the beauty and good appearance of its interesting reptile exhibition.
3. For more details about Carl Hagenbeck see, e.g. Leutemann (1887), Hagenbeck (1909), Sokolowsky (1928), Zukowsky (1929, 1954), Niemeyer (1972), and Dittrich and Rieke-Müller (1998).
4. Dörries had previously served as the first feed master at the Zoological Garden in Hamburg, which had been founded in 1863, but had to close in 1930, partly due to competition from Hagenbeck’s Zoo (Weidner 1969).
5. Among the many animals he saw at Hagenbeck, Meyer (1873) observed a quagga (*Equus qu. quagga*), probably one of the last specimens of this iconic subspecies of zebra, which was declared extinct just ten years later.
6. The historical “Hamburg foot” (Hamburger Fuß) measured 28.6 cm (Moznik 1848). However, it is possible that Hagenbeck used the English foot measurement of 30.48 cm as the basis for his calculations (see Koch and Schweiger 2023a).
7. Note that the Komodo dragon (*V. komodoensis*) was not known at the time and was not scientifically described until 1912.
8. However, the natural history trading business of J. F. G. Umlauff (1833–1889), who was married to Carl Hagenbeck’s sister Johanna Friederike Caroline (1839–1918) was not explicitly mentioned, although dead animals were also regularly sent to his brother-in-law to be stuffed or skeletonized for resale (Koch 2024).
9. Johann von Fischer ran a pet shop (including reptiles) in Gotha from around 1873. Previously, he had owned a large private collection of reptiles, mainly tortoises, in St Petersburg. In 1878, he became director of Düsseldorf’s zoological garden, founded only two years earlier (Adler 2012), where Carl Hagenbeck’s first reptile exhibition was held in 1880 (Dittrich and Rieke-Müller 1998). Alongside Hagenbeck and Umlauff, von Fischer (1884) was aware of various other European animal dealers, such as Charles Jamrach (1815–1891) and Abrahms in London, who specialized in Australian reptiles.
10. Von Fischer (1884: 101) made the following observation regarding the availability of chameleons and many other reptiles for herpetoculture: “Before 1876, these interesting lizards were very rare or unavailable, but in 1879, thousands of them were brought onto the market. Abrahms in London alone sent me several hundred in one consignment. They flooded the market and the prices fell to an insignificant amount.”
11. However, Leutemann’s (1887: 51) account makes it clear that Carl Hagenbeck did not disdain small species either. When receiving a group of Nubians for a new ethnological exhibition in June 1876, the businessman took advantage of his time in Trieste to purchase thousands of tortoises (probably *Testudo hermanni*), which were sold as soup meat at the local market, and transport them to Hamburg.
12. In this context, Leutemann (1887: 33) reported on the capture of snakes for Hagenbeck in India and the associated mortality during their long journey to Germany: “Thus, a snake hunt was organized for H. in the area of the Ganges estuaries (...), during which the grass was set on fire and the snakes were driven into nets. They were then placed in boxes or tied to bamboo poles, and brought to Calcutta first. Over 600 snakes were caught in total, 374 of which arrived alive in Hamburg.”
13. Hagenbeck’s popularity was probably also fueled by the fact that some young crocodiles once escaped from a steamer during a transport of animals, “plunging head over heels into the river Elbe”, as reported years later in the 9 September 1913 edition of the “Hamburger Fremdenblatt” (Anonymous 1913). This event, which inspired the folk song “Draußen auf der Elbe schwimmt ein Krokodil” (A crocodile swims out on the River Elbe, www.volksliederarchiv.de), occurred in the summer of 1888. J. F. G. Umlauff (1888) immediately and skillfully seized the opportunity to advertise “small living crocodiles” in his naturalia and pet shop.
14. Gronen (1884) estimated that 6,000 young alligators were caught in Florida each year. The price was 25 dollars for 100 specimens, or 75 cents to 1 dollar each. Specimens measuring 10–15 feet cost 25 to 60 dollars Réaumur.
15. Von Fischer (1884) also noted that the bullfrog was widespread in the trade and imported annually: “It is always available at Karl Hagenbeck and other pet shops for 20 to 25 marks per specimen.”
16. As these were often trade names, it is sometimes impossible to determine the taxonomic identity of the species in question. Even when scientific names are used, which appear to be mostly based on Boulenger’s catalogues, it remains unclear which species were actually involved. It was only later that the Hagenbeck company employed scientifically trained zoologists such as Alexander Sokolowski (1866–1949) and Ludwig (Karl) Zukowski (1888–1965). However, neither of them were pure herpetologists, although Sokolowski received his doctorate in 1899 with a thesis on the external covering of lacertilians (“über die äussere Bedeckung bei Lacertilien: ein Beitrag zur Phylogenie der Lacertilien”) and was one of the founding members of the “Association of terrarium enthusiasts” (Bund der Terrarienfreunde) in 1908 (Rieck 2001: 53). Strangely enough, Carl Hagenbeck himself became a member of the “Association of reptile and amphibian friends” (Bund der Reptilien- und Lurch-Freunde), which was founded in 1914, even though he had died the previous year (Rieck 2001: 56).
17. See also Werner (1904), who remarked: “The desert monitor is available for 4–5 Mk., *V. bengalensis* for about 25 Mk., *V. varius* for 30–50 Mk., and *V. niloticus* for 15–25 Mk. Specimens of *V. salvator* suitable for terrariums are rarely available in the trade and cost as much as the rarer species.” Franz Werner kept *V. grieseus* alongside *V. varius* and *V. bengalensis* for six years, whereas he studied *V. niloticus* and *V. exanthematicus* in the Vienna Vivarium.
18. While scientific names were not italicized in the previous two price lists, as is the consensus, this is now the case and gives the commercial enterprise an academic feel.
19. It is said that a precursor event took place in Dresden’s zoological garden as early as 1878/79 (Dittrich and Rieke-Müller 1998). And Ernst Pinkert (1844–1909) from Leipzig exhibited a group of Mississippi alligators and Alligator snapping turtles in a fenced pond in the summer of 1877, even before the Leipzig Zoo was founded. He took these giant reptiles over on commission from Carl Hagenbeck (Engelmann 2004).
20. The opening advertisement in the 18 April 1897 edition of the newspaper “Wiener Caricaturen” announced giant crocodiles (“Riesenkrokodile”) as a special attraction. These were undoubtedly the two large gharial specimens that Hagenbeck (1909) later mentioned in his memoirs (see above and at the end of the article).

21. Werner (1899a: 37) considered 29° Réaumur (equivalent to 36.25° Celsius or 97.25° Fahrenheit) to be the maximum temperature that may occur in the cage, while it is most comfortable between 16° and 25° [equivalent to 20°–31° Celsius or 68–87.8° Fahrenheit].
 22. For example, Werner (1899a: 14) reported on the durability of *Chelodina longicollis*, “of which I bought a large specimen at the Vivarium two years ago, thinking it was dead, but it is still alive today and is the most affectionate turtle I have ever had.”
 23. Today, most of the new taxa described by Werner (1897c) are considered synonyms of the nominate form *Natrix t. tessellata* (Uetz et al. 2025).
 24. Jacobs et al. (2009) doubted the origin Sumatra and consider this taxon to be a nomen nudum.
 25. From the late 1930s to the late 1990s, the Alexander Koenig Museum in Bonn also displayed an impressive six-meter-long rock python in its exhibition (Koch 2022), which the author remembers well from his childhood.
- ## REFERENCES
- Adler, K. 1989. *Contributions to the History of Herpetology*. Oxford, Ohio, Society for the Study of Amphibians and Reptiles.
- Adler, K. 2007. *Contributions to the History of Herpetology*, Volume 2. Saint Louis, Missouri, USA, Society for the Study of Amphibians and Reptiles.
- Adler, K. 2012. *Contributions to the History of Herpetology*, Volume 3. Salt Lake City, Society for the Study of Amphibians and Reptiles, 564 p.
- Andratschke, C., C. M. Hoes and A. Krieger 2024. *Colonial Dimensions of the Global Wildlife Trade*. Veröffentlichungen des Netzwerks Provenienzforschung in Niedersachsen, volume 6. Heidelberg, arthistoricum.net-ART-Books.
- Anonymous 1880. C. Hagenbeck's Handels-Menagerie in Hamburg. *Das Buch für alle* 15(7): 157, 159.
- Anonymous 1881. Die Preise der Thiere. *Der Zoologische Garten*, 22: 279–282.
- Anonymous 1883. Zoologischer Garten in Basel. *Der Zoologische Garten*, 24: 342–344.
- Anonymous 1886. Carl Hagenbeck interviewed. *The Era*, April 24, 1886, page 3. London.
- Anonymous 1896. Mitteilungen aus dem Zoologischen Garten bei Kopenhagen. *Der Zoologische Garten*, 37: 250–253.
- Anonymous 1913. Walfische in der Elbe. *Hamburger Fremdenblatt*, 85. Jahrgang, 1. Beilage zu Nr. 211, S. 5. Hamburg, den 9. September 1913.
- Anonymous 1919. Letter to Otto zur Strassen dated 12 December 1919 from Essen-Rüttenscheid. Senckenberg Archive, Signature ISG FFM Bestand V176 Nr. 197.
- Belloso, H., L. Dirksen and M. Auliya 2007. *Faszination Riesenschlangen – Mythos, Fakten und Geschichten*. BLV Book publisher, Munich.
- Berg, J. 1901. Indische Dryophiden im Terrarium. *Der Zoologische Garten* 42: 204–215.
- Bischoff, W. 2018. *Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum – II*. Mertensiella 27. Mannheim, Deutsche Gesellschaft für Herpetologie und Terrarienkunde (DGHT).
- Bischoff, W. 2024. Pedro de Grijns (1864–1940). p. 226–229 in: Bischoff, W. (Ed.): *Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum – III*. Mertensiella 33 (Supplement zu Salamandra). Salzhemmendorf, Deutsche Gesellschaft für Herpetologie und Terrarienkunde (DGHT).
- Böhme, W. 2005. Zum Lebensende von Dr. Paul Kammerer (1880–1926). *Sekretär* 5(1): 19–27.
- de Grijns, P. 1901. Beobachtungen an Reptilien in Gefangenschaft. *Der Zoologische Garten*, 42: 33–46, 65–76, 97–109.
- de Grijns, P. 1937. Eine neue Eidechse aus Nord-Borneo: *Calotes kinabaluensis*. *Zoologischer Anzeiger*, 117: 136–138.
- Dittrich, L. and A. Rieke-Müller 1998. *Carl Hagenbeck (1844–1913). Tierhandel und Schaustellungen im Deutschen Kaiserreich*. Peter Lang, Europäischer Verlag der Wissenschaften, Frankfurt a.M.
- Engelmann, W.-E. 2004. Zur Geschichte des Aquarien- und Terrarienhauses im Zoologischen Garten Leipzig. *Sekretär*, 4(1): 15–27.
- Gronen, D. 1884. [Miscellen]. *Der Zoologische Garten*, 25: 375.
- Hagenbeck, C. 1883. *Preis-Verzeichniss des jetzigen Thiervorrathes*. Hamburg, den 16. October 1883, Carl Hagenbeck's Handelsmenagerie und Thierpark, Hamburg.
- Hagenbeck, C. undated [1897/1898]. [Preisliste der überzählig abzugebenden Reptilien und Amphibien des Wiener Vivariums]. Wien, Wiener Vivarium, 2 pp.
- Hagenbeck, C. 1898. *Preis-Verzeichniss des jetzigen Thier-Vorrathes* [von Carl Hagenbeck's Handelsmenagerie und Thierpark, Hamburg]. Adolph Friedländer's printing house, Hamburg, 6 p.
- Hagenbeck, C. 1909. *Von Tieren und Menschen. Erlebnisse und Erfahrungen von Carl Hagenbeck*. Vita Deutsches Verlagshaus, Berlin.
- Hagenbeck 1914. [Title probably „Preis-Verzeichniss des jetzigen Thier-Vorrathes“ or similar]. Hamburg, [presumably Carl Hagenbeck's Handelsmenagerie und Thierpark], 17 p.
- Hagenbeck, L. 1955. *Den Tieren gehört mein Herz*. Stuttgarter Hausbücherei, Vienna.
- Hanau, A. 1898. Betrachtungen über die Fütterung der Kreuzotter (*Vipera berus* L.) in der Gefangenschaft. *Der Zoologische Garten*, 39: 150–154.
- Honegger, R. E. and D. G. Blackburn 2022. The Arrival of the Dragons of our Forefathers, or Some Remarks on Early [non-English] European Encounters with Exotic Reptiles. *Bibliotheca Herpetologica* 16(9): 94–117.
- Jacobs, H. J., M. Auliya and W. Böhme 2009. Zur Taxonomie des Dunklen Tigerpythons, *Python molurus bivittatus* Kuhl, 1820, speziell der Population von Sulawesi. *Sauria*, 31(3): 5–16.
- Koch, A. 2022. Der Felsenpython der Gräfin Dönhoff im Museum Koenig und die Geschichte dieses ungewöhnlichen Geschenks. *Koenigiana*, 16: 11–30.
- Koch, A. 2024. Der Einfluss der Hamburger Handelshäuser Hagenbeck und Umlauf auf die Herpetologie und Terrarienkunde im deutschsprachigen Raum. Pp. 701–741 in: W. Bischoff (Ed.): *Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum – III*. Mertensiella 33. Salzhemmendorf, Deutsche Gesellschaft für Herpetologie und Terrarienkunde (DGHT).
- Koch, A. and S. Schweiger 2023a. Zur Provenienz der beiden großen Gangesgaviale in der Schausammlung des Naturhistorischen Museums Wien. *Annalen des Naturhistorischen Museums in Wien, B* 125: 83–100.
- Koch, A. and S. Schweiger 2023b. On the Provenance of the two large Gharials in the Display Collection of the Natural History Museum Vienna. *Bibliotheca Herpetologica* 17(8): 67–82.
- Koch, A., Bayer, S., and U. Joger 2017. Die Kobra aus Querum: ein kurioses Zeugnis historischer Völkerschauen im Naturhistorischen Museum Braunschweig? *Natur im Museum* 7: 30–32.

- Koestler, A. 1971. *The Case of the Midwife Toad*. Hutchinson, London, 187 p.
- Koestler, A. 1974. *Der Krötenküsser. Der Fall des Biologen Paul Kammerer oder Für eine Vererbungslehre ohne Dogma*. rororo, Reinbek, 221 p.
- Leutemann, H. 1887. Lebensbeschreibung des Thierhändlers Carl Hagenbeck. Self-publishing, Hagenbeck, Hamburg.
- Meyer, R. 1873. Ein Gang durch die C. Hagenbeck'sche Handels-Menagerie. *Der Zoologische Garten*, 14: 25–27.
- Mozhnik F. 1848. *Lehrbuch des gesamten Rechnens für die vierte Classe der Hauptschulen in den k.k. Staaten*. Verlag der k.k. Schulbücher Verschleiß-Administration, Vienna, 288 p.
- Niemeyer, G.H.W. 1972. *Hagenbeck - Geschichte und Geschichten*. Hans Christians publisher, Hamburg.
- Pelc, O. 2000. Hagenbeck auf den Weltausstellungen in Chicago (1893) und St. Louis (1904). *Zeitschrift des Vereins für Hamburgische Geschichte* 86: 89–113.
- Reiter, W. L. 1999. Zerstört und vergessen: Die Biologische Versuchsanstalt und ihre Wissenschaftler/innen. *Österreichische Zeitschrift für Geschichtswissenschaften*, 10(4): 585–614.
- Rieck, W. 2001. Die ersten Terrarienausstellungen und erste Gründungsversuche von Terrarienvereinen. Pp. 47–60 in: W. Rieck, G. Hallmann and W. Bischoff (Eds.): *Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum*, Mertensiella 12. Rheinbach, Deutsche Gesellschaft für Herpetologie und Terrarienkunde (DGHT).
- Rieck, W. and W. Bischoff 2001. Paul Kammerer (1880–1926). Pp. 483–488 in: W. Rieck, G. Hallmann and W. Bischoff (Eds.): *Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum*, Mertensiella 12. Rheinbach, Deutsche Gesellschaft für Herpetologie und Terrarienkunde (DGHT).
- Rieck, W., G. Hallmann and W. Bischoff 2001. Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum, Mertensiella 12. Rheinbach, Deutsche Gesellschaft für Herpetologie und Terrarienkunde (DGHT).
- Schubert, G. 1883. Aus dem Berliner Aquarium. *Der Zoologische Garten*, 24: 186–188.
- Sokolowsky, A. 1928. *Carl Hagenbeck und sein Werk*. Buch- und Kunstdruckerei E. Haberland, Hamburg.
- Thode-Arora, H. 1989. *Mit fünfzig Pfennig um die Welt. Die Hagenbeckschen Völkerschauen*. Campus Verlag, Frankfurt a.M./New York.
- Uetz, P., P. Freed, R. Aguilar, F. Reyes, J. Kudera and J. Hošek 2025. The Reptile Database.
- Umlauff, J.F.G. 1888. Kleine lebende Krokodile empfiehlt die Naturalienhandlung von J. F. G. Umlauff, Spielbudenplatz 8. *Hamburger Fremdenblatt*, den 25. August 1888, Hamburg, p. 18.
- von Fischer, J. 1884. *Das Terrarium, seine Bepflanzung und Bevölkerung. Ein Handbuch für Terrarienbesitzer und Tierhändler*. Mahlau & Waldschmidt, Frankfurt a.M., 384 p.
- Weidner, H. 1969. Fritz Dörries, ein Hamburger Forschungsreisender in Ostsibirien. *Die Heimat - Monatsschrift des Vereins zur Pflege der Natur- und Landeskunde in Schleswig-Holstein und Hamburg* 76(10): 313–320.
- Werner, F. 1897a. Im Wiener Vivarium. Hagenbecks Reptilien-Ausstellung. *Der Zoologische Garten*, 38: 204–212.
- Werner, F. 1897b. Neues aus dem Wiener Vivarium. *Der Zoologische Garten*, 38(9): 257–263.
- Werner, F. 1897c. Über einige noch unbeschriebene Reptilien und Batrachier. *Zoologischer Anzeiger*, 20: 261–267.
- Werner, F. 1898. Beobachtungen über die Giftigkeit der Trugschlangen (Opisthoglypha). *Der Zoologische Garten*, 39: 85–90.
- Werner, F. 1899a. Des Wiener Vivariums Ende. *Der Zoologische Garten*, 40(2): 33–38.
- Werner, F. 1899b. Auf der Reptilienjagd in Ägypten. *Der Zoologische Garten*, 40(2): 277–288.
- Werner, F. 1899c. Allerlei aus dem Kriechtierleben im Käfig II. *Der Zoologische Garten*, 40: 12–24.
- Werner, F. 1900. Riesenschlangen in Gefangenschaft (Schluß). *Der Zoologische Garten*, 41: 274–287.
- Werner, F. 1901. Noch einmal das Vivarium in Wien. *Der Zoologische Garten*, 42(1): 1–5.
- Werner, F. 1903. [Briefliche Mitteilungen]. *Der Zoologische Garten*, 44: 27–28.
- Werner, F. 1904. Die Warane. *Blätter für Aquarien- und Terrarienkunde*, 15: 84–87, 99–101.
- Werner, F. 1912. Die Lurche und Kriechtiere – Erster Band. In: zur Strassen, O. (Ed.): *Brehms Tierleben, Allgemeine Kunde des Tierreichs*, IV. Band. Bibliographisches Institut, Leipzig and Vienna, 572 p.
- Werner, F. 1913. *Die Lurche und Kriechtiere – Zweiter Band: Kriechtiere (Schuppenkriechtiere)*. In: zur Strassen, O. (Ed.): *Brehms Tierleben, Allgemeine Kunde des Tierreichs*, V. Band. Bibliographisches Institut, Leipzig and Vienna, 598 pp.
- Zukowsky, L. 1914. Über einige seltene und kostbare Tiere in Carl Hagenbecks Tierpark. *Der Zoologische Garten*, 55: 179–187, 213–217, 228–234.
- Zukowsky, L. 1929. *Carl Hagenbecks Reich. Ein deutsches Tierparadies*. Wegweiser-Verlag, Berlin.
- Zukowsky, L. 1954. Kleine Hagenbeck-Erinnerungen. *Der Zoologische Garten*, 21(1/2): 9–24.

We suggest the following format for citing this article:

André Koch, A. 2025. Carl Hagenbeck's Trade in Reptiles, his historical Reptile Exhibitions, and his herpetological Legacy. *Bibliotheca Herpetologica* 19(12):132–150.



Wahlgreniana

A series of book length works complementing the ISHBH journal, *Bibliotheca Herpetologica*. Books in this series are published on an irregular basis and are sold separately from ISHBH subscriptions. The series is named in honor of Richard Wahlgren (1946–2019), a founding member and first Chairman of the society.

All volumes may be ordered directly from the society (ISHBH members receive a 40% discount.), or from many online bookstores.

Volume 1 – Bour, Roger and Josef F. Schmidtler. 2022. *Nikolaus Michael Oppel's Drawings, Watercolors, and Engravings 3. Crocodiles (1807–1817): A comparative study of some historical and recent crocodile illustrations*. ISHBH, Salt Lake City, x, 184 p. Hardcover. Includes a complete facsimile of Tiedemann, F., M. Oppel & J. Liboschitz 1817. *Naturgeschichte der Amphibien. Erstes Heft. Gattung Krokodil*. Joseph Engelmann, Heidelberg. v–vi, 1–88, vii–viii. Auf Kosten der Verfasser, München, 15 pls. \$65.00 (ISHBH members price \$39.00), plus postage.

Volume 2 – Dodd, C. Kenneth, Jr. 2022. *Bibliography of the Anurans of the United States and Canada. Version 3. Part 1: 1698–2012. Part 2: 2013–2021*. ISHBH, Salt Lake City, x, 282 p. \$35.00 (ISHBH members price \$21.00), plus postage.

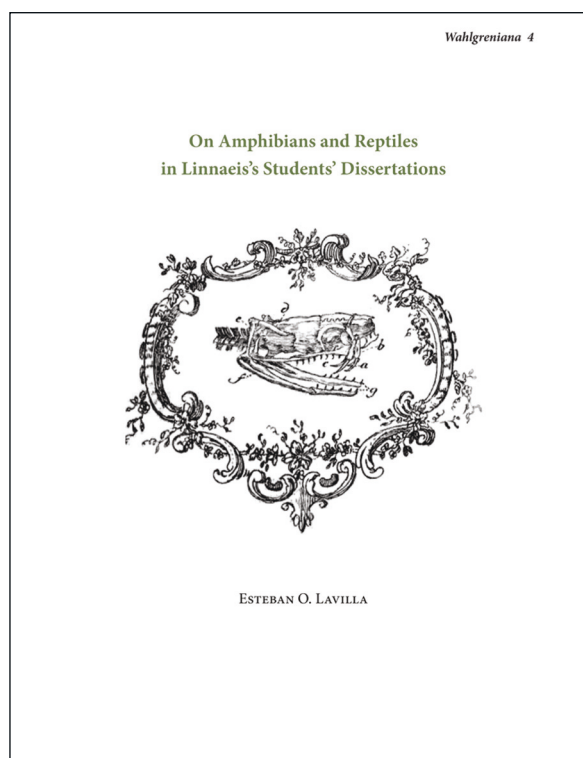
Volume 3 – Moriarty, John J. and Aaron M. Bauer. 2024. *State and Provincial Amphibian and Reptile Publications for the United States and Canada, Second Edition*. ISHBH, Salt Lake City, vi, 85 p. Paperback. \$15.00 (ISHBH members price \$9.00), plus postage.

Volume 4 – Lavilla, Esteban O. 2026. *On Amphibians and Reptiles in Linnaeus's Students' Dissertations*. ISHBH, Salt Lake City, vi. 136 p. Hardcover. \$40.00 (ISHBH members price \$24.00), plus postage.

Available, January 2026. Linnaeus oversaw 185 doctoral dissertations throughout his career. These theses, often overlooked in the vast Linnaean legacy, offer valuable insights into the scientific understanding of amphibians and reptiles during the 18th century.

Two of these theses, *Siren lacertina* and *De Morsura serpentum*, deal with amphibians and reptiles as central topics. Another three, *Amphibia Gyllenborgiana*, *Museum Adolpho-Friedericianum*, and *Surinamensia Grilliana*, describe collections that were duly donated to the University, all of which have a significant component of Amphibia in the Linnaean sense. Two more, *Lignum colubrinum* and *Radix senega*, deal with the identification and uses of supposed antivenins of vegetal origin. In addition to these seven, amphibians and reptiles were occasionally mentioned in another 25 dissertations.

This volume contains English translations of seven complete dissertations, plus the herpetological portions of twenty-five additional dissertations. The 466 added footnotes and an extensive bibliography, place these translations in their original context and makes them accessible to the modern reader.





International Society for the History and Bibliography of Herpetology

Bibliotheca Herpetologica Vol. 19

Formerly the *International Society for the History and Bibliography
of Herpetology Newsletter and Bulletin*

Contents

From the Chairman	i
From the Editor	i
About the Cover	ii

Articles

Dodd, C. K. Jr. 2025. How to Raise a Bullfrog—A Further Update with Information on a Possible Albert Broel Manuscript.	1
Bauer, A. M. 2025. Comments on Early Herpetological publications about Prince Edward Island, Atlantic Canada.	7
Shea, G. M. 2025. The Mysterious Doctor Rurk and His Eponymous Catskink, <i>Ristella rurkii</i> Gray 1839 (Squamata: Scincidae: Lygosominae: Ristellini) with Notes on Other Collectors for the Museum of the Army Medical Service at Chatham.	12
Dodd, C. K. Jr. 2025. Herpetological Contributions of Charles Conrad Abbott, Eccentric 19 th Century Archeologist and Naturalist.	28
Bauer, A. M. 2025. John Hutchison Garnier (1823–1898) and his Contributions to the Herpetology of Ontario.	35
Jacobs, H. J., and G. M. Shea. 2025. The Natuurkundige Commissie on New Guinea in 1828. II. Serpentes (Colubridae, Elapidae, Typhlopidae) and Sauria (Agamidae, Dibamidae, Gekkonidae, Varanidae).	57
Bauer, A. M. 2025. <i>Testudo atlas</i> Barton, 1806, a long-forgotten synonym of the Gopher Tortoise (<i>Gopherus polyphemus</i>) and a senior secondary homonym of the largest tortoise that ever lived.	101
Dodd, C. K. Jr. 2025. Herpetology in the Report of the First Scientific Expedition to Manchuokuo.	108
Lavilla, E. O. 2025. Science, Myth, and Otherness: Herpetological Readings of Linnaeus's Lapland Journal.	116
Bell, C. J., and S. Skwarcan. 2025. A Snake Icon in Industrial Advertising: Oldsmobile, the 39 th Fighter Squadron and <i>Life</i> Magazine in 1943.	122
Dodd, C. K. Jr. 2025. A Note on Carolina Frog Farms, Columbus County, North Carolina, USA.	128
André Koch, A. 2025. Carl Hagenbeck's Trade in Reptiles, his historical Reptile Exhibitions, and his herpetological Legacy.	132